Hullings, Lori

From: EVC Simmons
Sent: Thursday, January 11, 2024 4:19 PM
To: Hildebrand, John; Graeve, Olivia; Hullings, Lori; Hill, Ashley
Cc: Chancellor Pradeep Khosla; Best, Brookie; Carethers, John; Kim James; Kim James; Rhodes, Brandon; Rhodes, Brandon; John Carethers; Senior AVCAA; Sanders, Alison; AVC-AA; Arntsen, Carolyn
Subject: Re: SSPPS - Department Proposal

Dear Chair Hildebrand,

Please find a proposal to establish two departments in the Skaggs School of Pharmacy and Pharmaceutical Sciences attached.

We have completed the administrative review process and are pleased to formally submit the proposal for review by the Academic Senate.

With best regards,

Elizabeth H. Simmons
Executive Vice Chancellor, Academic Affairs
University of California, San Diego

9500 Gilman Drive #0001
La Jolla, CA 92093-0001
(858) 534-2230
evc@ucsd.edu

pronouns: she/her/hers

From: Kim James <kimjames@health.ucsd.edu>
Sent: Thursday, October 5, 2023 10:32 AM
To: EVC Simmons <evc@ucsd.edu>
Cc: Sanders, Alison <amsanders@UCSD.EDU>
Subject: SSPPS - Department Proposal

Dear EVC Simmons,

Attached please find a proposal from Dean Brookie Best, to establish two departments in the Skaggs School of Pharmacy and Pharmaceutical Sciences. The proposal has been reviewed by the Vice Chancellor’s Office for Academic Affairs, Resource Management in the Health Sciences Vice Chancellor’s Office, and the Health Sciences Faculty Council.

If additional information is needed, please let me know.
Sincerely,  
Kim  

Kim James | Director, Academic Affairs  
Office of the Vice Chancellor | UC San Diego Health Sciences| kimjames@health.ucsd.edu
September 23, 2023

University of California, San Diego
Academic Senate

Dear Members of the UC San Diego Academic Senate,

We propose to establish two departments of approximately equal size in the UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences (SSPPS) in the broad areas of pharmacy practice (the Department of Pharmacy Practice and Sciences) and pharmaceutical sciences research (the Department of Pharmaceutical Sciences). SSPPS began in 2002 and has operated as a single department, with the Dean serving as the Department Chair. With the growth and success of the school over the last two decades, we are ready to move forward with permanent, official governance structures that align with UC San Diego governance models, and allow for long-term stability, priority alignment, and advancement of our programs.

Formation of the departments will utilize allocation of existing funding within the school and be budget-neutral. One overarching benefit of forming departments is that this will free up the Dean’s efforts to pursue school-wide endeavors and required Dean activities both internally and externally; rather than trying to fulfill both Dean and all Department Chair responsibilities for the entire school. Key changes/advantages with the formation of departments include substantially improved: 1) faculty oversight and accountability, 2) school representation by department chairs within health sciences, across campus, and across professional organizations, 3) faculty recruitment and retention, 4) national stature, and 5) targeted Advancement support for both departments to enhance fundraising. Areas of the school that will not substantially change or be affected by the formation of departments include educational programs (PharmD, Master’s degree, graduate training, Residencies, Fellowships, other), budget and space, and administrative support. Thank you for your consideration of this proposal.

Sincerely,

Brookie M. Best, PharmD, MAS
Dean, Skaggs School of Pharmacy and Pharmaceutical Sciences
Processor of Clinical Pharmacy and Pediatrics
Proposal for the formation of two departments, the Department of Pharmacy Practice and Sciences and the Department of Pharmaceutical Sciences, within the UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences

May 2023
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Drs. Momper and Capparelli (Clinical X and RTAD) have a therapeutic drug monitoring service to provide dosing recommendations based on drug concentrations measured in their laboratory. The rest of the faculty in this proposed department do not have clinical licensure, so the department as a whole will not have a large clinical footprint. 

B.5. Space Allocation

B.6. Equipment

B.7. Organization Chart

C. Faculty Appointments and Commitment

D. Financial Package

D.1. 5-year projected fiscal plan

E. Transition Plans for the Proposed Department of Pharmaceutical Sciences

E.1. Education

E.2. Resources

E.3. Research and Laboratory Facilities

E.4. Industry Relationships

E.5. Contributions of the Proposed Department of Pharmaceutical Sciences to the University, State, National, and International Programs Illustrate SSPPS as a Hub for Translational Therapeutics Innovation

Closing Summary

Appendix I. Letters of Support: Leadership and Health Sciences Faculty Council

Appendix II. Faculty Profiles

Appendix III. Faculty Extramural Support

Appendix IV. Faculty Publications from 2018 – 2022
Executive Summary

We propose to establish two departments in the UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences (SSPPS) in the broad areas of pharmacy practice and pharmaceutical sciences research. SSPPS began in 2002 and has operated as a single department, with the Dean serving as the Department Chair. With the growth and success of the school over the last two decades, we are ready to move forward with permanent, official governance structures that allow for long-term stability, priority alignment, and advancement of our programs. We propose forming two departments of approximately equal size, in line with the function of our current three Divisions – the Clinical Pharmacy Division will become the Department of Pharmacy Practice and Sciences, and the Pharmaceutical Sciences and Pharmaceutical Chemistry Divisions will become the Department of Pharmaceutical Sciences. To start, internally-recruited Department Chairs will directly lead each of the two departments, reporting to the Dean. Formation of the departments will utilize allocation of existing funding within the school and be budget-neutral. Other departmental infrastructure, including administrative support and space, is already in place and will not substantially change. One overarching benefit of forming departments is that this will free up the Dean’s efforts to pursue school-wide endeavors and required Dean activities both internally and externally; rather than trying to fulfill both Dean and all Department Chair responsibilities for the entire school. Figure 1 below shows the expertise and interest areas of the faculty of the proposed departments.

Figure 1. Interplay between Expertise Areas of the Two Proposed Departments

Skaggs School of Pharmacy and Pharmaceutical Sciences (SSPPS):
Optimizing Use of Therapeutics in Practice and Addressing Unmet Needs through Innovative Drug Discovery

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<td>Proteomics, Metabolomics, Peptidomics, &amp; Bioinformatics</td>
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<td>Integration of Multi-Omics for Drug Biomarkers</td>
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History

In 2000, UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences was approved by UCOP and UC Regents and enrolled the Charter Class in Fall 2002. Since its opening in 2002, UC San Diego SSPPS has risen to the top ranks of 142 accredited schools of pharmacy in the United States. According to the US News and World Report, UC San Diego SSPPS is ranked the #18 pharmacy school in the country for its pre-eminent health sciences professional education and research accomplishments. SSPPS has achieved this distinction through the success of its graduates, high caliber of faculty research and clinical programs, and its collaborative leadership from local communities to international venues.

The school was initially established with a small group (i.e., less than 10) of staff and faculty, facilitating operations as a single department. The Dean served (and still serves) as the official Department Chair, with the entire school officially functioning as a single department. After two decades of operation, SSPPS has grown to 58 salaried faculty, over 30 staff, and numerous academic, research and community programs; the current structure is no longer viable. Departments are needed to improve faculty workload, oversight, mentorship, recruitment and retention, to address the unique challenges
faced by clinical and basic science faculty, to empower chairs with appropriate authority both internally and externally, and to strengthen our reach in philanthropy and resource procurement.

In 2016, at the request of the faculty, Dean James McKerrow established three informal Divisions: Clinical Pharmacy (27 faculty), Pharmaceutical Chemistry (14 faculty), and Pharmaceutical Sciences (17 faculty). Each Division is led by an elected Division Head who serves a three-year term. The Division Heads are the primary faculty advocates, managing day-to-day issues, conducting annual faculty reviews, assigning committee service responsibilities, providing an evaluation of and feedback on academic files, recruiting and onboarding new faculty, and representing the school on standing Health Sciences and general campus department chair committees. The division structure has improved the identification and resolution of faculty concerns or problems, organized their respective faculty into a unified voice, assisted the leadership team with fair and balanced workload distribution, and generated new initiatives and impactful cross-campus collaborations. The Clinical Pharmacy Division has quarterly and ad hoc meetings, and each faculty member meets individually with the Division Chair annually. The Pharmaceutical Sciences and Pharmaceutical Chemistry Divisions hold joint meetings quarterly and ad hoc, effectively functioning as a single unit. The creation of our current division structure was helpful, but many governance challenges remain while the official school structure is still a single department.

Rationale

To overcome the limitations of our current Division structure, we anticipate significant benefits from the formation of departments:

1. Faculty Oversight: Departments will substantially better align faculty oversight, which is currently informally delegated to Division Heads, even though faculty do not report to the Division Heads. Departments will empower the Department Chair with appropriate faculty oversight authority and the ability to make and enact decisions. This will allow the Dean more time to focus effort on fundraising, marketing, high-level oversight, and broad collaborations, in partnership with the Department Chairs.

2. Representation to Health Sciences and General Campus: The official designation of departments will better alignSSPPS representation on health science and campus committees. Our Division Heads are currently invited to some, but not all, Health Sciences and Campus Department Chair meetings, where they may or may not be privy to the same background information and context available to the official Department Chairs for the discussions. Further, our Division Head role in some settings is unclear and confusing, given that the Dean is still the Department Chair. Departments will further improve SSPPS representation in leadership recruitments that involve department chairs; development and advancement events; and a myriad of other UC San Diego-wide venues, where our entire school is currently only represented by one person, the Dean.

3. Representation to Professional Organizations: SSPPS Department Chairs will be able to participate with equal stature as other pharmacy school Chairs at external professional organization venues that host Chair events and groups, where we currently lack representation.

4. External Visibility for Partnerships, Collaborations, and Recruitment: A clearer organizational structure is more understandable to internal (i.e., campus collaborations) and external stakeholders (i.e., health-systems, academics, industry) and enhances recruitment efforts.

5. Nearly all pharmacy schools have academic departments; of the top twenty-ranked schools of pharmacy in the U.S., 85% have academic departments.

As our school has continued to mature, we have outgrown our start-up organizational structure. We need to move forward with permanent, official governance structures that allow for long-term stability, priority alignment, and empowerment of the chairs which will translate to better faculty and school outcomes. School-wide functions will continue to be led and supported by corresponding Associate Dean Offices. An internal recruitment for an Associate Dean for Research and Innovation is underway; this position will strengthen and facilitate research growth within and across the proposed departments.

In short, the key changes/advantages with the formation of departments include substantially improved: 1) faculty oversight and accountability, 2) school representation by department chairs within health sciences, across campus, and across professional organizations, 3) faculty recruitment and retention, 4) national stature, and 5) targeted Advancement support for both departments to enhance fundraising. Areas of the school that will not substantially change or be affected by the formation of departments include educational programs (PharmD, Master’s degree, graduate training, Residencies, Fellowships, other), budget and space, and administrative support.
We propose forming two departments of approximately equal size that reflect the current operational structure of our three Divisions – the Clinical Pharmacy Division will become the Pharmacy Practice and Sciences Department, and the Pharmaceutical Sciences and Pharmaceutical Chemistry Divisions will become the Pharmaceutical Sciences Department (see Figure 2. Proposed Organizational Chart below). Below are descriptions of school functions that will continue to be relevant to both departments (Education, Core Administration, and Diversity, Equity and Inclusion), followed by a description of each of the two individual departments.

Figure 2. SSPPS Proposed Organization Chart
Education

The primary educational program delivered by SSPPS is the Doctor of Pharmacy (PharmD) degree program (see Figure 3). Both departments will have core responsibilities to support and deliver the PharmD degree curriculum. The proposed Pharmacy Practice and Sciences Department will be responsible for teaching the majority of the Clinical and Social/Administrative/Behavioral Sciences required elements of the curriculum, while the proposed Pharmaceutical Sciences Department will be responsible for teaching most of the required Pharmaceutical Sciences and research elements of the PharmD curriculum (refer to Appendix 1 of the Accreditation Council for Pharmacy Education Standards 2016 for details). Neither department alone has the expertise and background to provide all required elements for a PharmD curriculum – both departments, along with key health sciences partners, will continue to provide critical teaching and training support for the PharmD degree. The collaborative approach will provide a stellar educational program founded on strong basic science and an excellent clinical curriculum. The PharmD program is accredited nationally by the Accreditation Council for Pharmacy Education.

SSPPS has several joint degree programs. For our joint BS/PharmD program, the Department of Chemistry and Biochemistry and the undergraduate college system provide the requisite coursework for the BS degree, and the PharmD degree is delivered by SSPPS. For our joint PharmD/PhD program, we partner primarily with Biomedical Sciences to deliver the PhD degree, and SSPPS divisions provide the PharmD education. For PharmD/Master’s degree programs, a similar structure exists, where the Master’s degree is delivered by the relevant collaborating unit, and the PharmD program is delivered by the divisions in our school. Faculty from both proposed departments in our school liaise with the other degree programs to ensure integration and successful completion of these dual degree programs by our trainees. Additional educational programs supported by each individual proposed department are described below in the department-specific sections. All educational components undergo administrative review by the SSPPS Committee on Educational Policy on a regular basis.

Administrative Support

The administrative staff will remain centralized within the school, supporting core functions delivered by both departments. For example, administrative staff supporting PharmD curriculum and educational programming, admissions, student affairs, and school accreditation will remain centralized. The school will continue to provide central administrative support staff for human resources, and for research such as contracts and grants, fund management, etc. In the short-term, the centrally-funded Administrative Coordinator that currently supports the Division Heads will continue to serve as the Administrative Coordinator for the Department Chairs. Also, the SSPPS Associate Dean for Business and Fiscal Affairs will serve as the initial Departmental Business Officer for both departments. As the departments grow over time, the support staff structure will be evaluated annually to determine which functions should remain centralized and which functions should be decentralized to the departments. We anticipate most of the administrative support to remain centralized over the long-term, but the department structure will allow for flexibility in each department to supplement the central administration in areas of specific departmental needs.

Academic Affairs

The new departments will adopt the current SSPPS voting policies as their departmental voting policies because these have been used successfully for both sets of faculty since the school’s inception. That said, per University policy, each department will be academically autonomous and, accordingly, will vote separately on academic actions using these
policies. Initially, the Deputy Dean will assist the Department Chair in the preparation of academic files and file letters. The Department Chair will present the files to the department faculty for review and discussion, after which the letters will be modified as needed based upon the discussion. The current SSPPS Human Resources staff will continue to support these activities. Routing of faculty files will follow current SSPPS procedure, with Health Sciences Clinical and Clinical X career-review files being reviewed by SSPPS CAP, the majority membership of which will be representatives from the Department of Pharmacy Practice and Sciences because SSPPS CAP reviews only clinical files. Files will then be submitted to the Health Sciences Assistant Vice Chancellor for Academic Affairs who will make final determination on Health Sciences Clinical files. Academic Senate files (including Clinical X files) will be forwarded to campus CAP. As departments mature, an SSPPS Associate Dean for Academic Affairs will be appointed (analogous to the School of Medicine Associate Dean for Academic Affairs) and that person will liaise with the Department Chairs to oversee the academic file through the approval process in coordination with HR and the Health Sciences Assistant Vice Chancellor for Academic Affairs.

Commitment to Equity, Diversity and Inclusion

UC San Diego SSPPS faculty and staff are fully committed to the principles of justice, equity, diversity and inclusion. The section below provides School-wide information and highlights initiatives involving faculty and staff from both proposed departments.

The gender and race/ethnic distribution of full-time SSPPS faculty is well balanced with ongoing efforts to improve faculty diversity. SSPPS currently has a 15-member gender-balanced EDI Committee comprised of diverse faculty, staff, and students, representing Black, LatinX, and LGBTQIA communities. The Committee meets once per quarter or more frequently as guided by the agenda. The Committee’s mission is to support faculty, staff, and students in the crafting and dissemination of strategies that provide for an inclusive climate, embrace diversity, and promote a culture of accountability with respect for all. The Committee also partners with campus, professional, and community organizations to promote, improve, and sustain excellence in EDI practices. In 2020, SSPPS hired Mr. Dominic Cooper as an EDI Project Manager at 20% effort. Based on the success of Mr. Cooper in this position and the substantial breadth and scope of activities that SSPPS wants to continue and expand, we increased support for this position and he now serves in a full-time career position as of January 2023, as our Program Manager of Diversity and Community Initiatives. Because of our SSPPS EDI activities and initiatives, Mr. Cooper received the 2022 UC San Diego Inclusive Excellence Award, and was selected as a Fellow for the Leader for Equity Advancement and Diversity (LEAD) program. With Mr. Cooper’s leadership and our EDI committee, we are currently evaluating our school-wide organizational structure for EDI support to identify areas for improvement. We are in the process of transitioning our EDI Committee to an Executive Council, which will align well with the new department structure. The Executive Council will have representatives from each department and from key functional areas within SSPPS. Each new department will have department-specific EDI activities and will identify representatives or Directors to embed within the school-wide EDI organization structure.

Recruitment and admissions into the PharmD program include a substantial commitment to outreach activities at Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Minority Serving Institutions, and Minority Health Clubs. Our successful Program for Underrepresented Minorities in Pharmacy (PUMP) provides mentorship and support for future pharmacists committed to serving underrepresented communities with health disparities. Our new Student Transfer Outreach & Mentorship Pharmacy Program (STOMPP) workshop supports transfer students who are mainly first generation college students and/or socioeconomically disadvantaged.

Improvements to the PharmD curriculum over the past several years include: (a) adding EDI topics and cases to didactic and experiential courses; (b) tracking and capturing students’ EDI-related experiences in service learning and co-curricular events; (c) adding inclusion statements to course and rotation syllabi; and (d) adding EDI-specific questions to course and curriculum committee review evaluations, and ongoing reviews of course materials and syllabi for enhancement of EDI topics. SSPPS created the Health Equity Anti-Racism Training (HEART) Initiative with the implementation of antibias and microaggression workshops offered to third-year pharmacy students. Additional workshops in the first and third years now cover topics of systemic racism, health disparities and equity, and social determinants of health. These discussions have highlighted how racism has had a profound and negative impact on communities of color with recent awareness to the disproportionate impact of the COVID-19 pandemic among minoritized populations.

SSPPS supports and fosters student-led initiatives and activities that promote an inclusive environment including the development of the LGBTQ Pharmacy and Medical Students Association (LGBTQ-PhaM) and Student National Pharmaceutical Association (SNPhA). LGBTQ-PhaM is part of the diversity coalition within the medical school campus, including: Asian Pacific American Medical Student Association, Latinx Medical Student Association, Medical Students for
Justice, Muslim Medical Student Association, Association of Native American Medical Students, and Student National Medical Association. Student organization events, such as Academic Community Team Interdisciplinary Outreach Network, and CSHP affiliated Culture Fusion embrace and highlight the diversity of our student body.

Notable faculty endeavors demonstrating community outreach and commitment to diversity, including the Californian Shaman Program, PATHways to STEM (PATHS) through Enhanced Access and Mentorship Program, and the Research Methodology Training Laboratory, are further described in the department-specific EDI sections below.

Space

Pharmaceutical Sciences Building (PSB) of SSPPS

The Pharmaceutical Sciences Building (PSB) houses the SSPPS Doctor of Pharmacy program, the Masters of Drug Development and Product Management program, along with graduate students and postdoctoral training programs. PSB consists of four floors and a basement area (shown in Figure 4).

The PSB includes approximately 12,000 sq. ft. of teaching space (classrooms, auditoriums, etc.), approximately 3,500 sq. ft. of administrative space supporting the pharmacy school, and approximately 35,000 sq. ft. of research and faculty office space. The activities of each of the PSB floors are as follows.

Basement. Teaching classrooms are located in the basement floor. The basement includes a large auditorium that seats up to 200 persons for joint lectures of the pharmacy and medical students. The basement has three medium-sized classrooms, two of which may be combined into a single larger classroom. Additionally, a large reception area with outside access is used for major events such as the White Coat ceremony, graduation reception, and campus-wide presentations and symposia. The basement also houses core laboratory facilities for NMR, mass spectrometry, servers, compound resources, and cold storage (-70°C freezers). SSPPS provided the grant funding that built the vivarium facilities in the basement level that are used by numerous health sciences investigators for animal research.

1st Floor. Teaching classrooms for pharmacy and graduate students are located on the 1st floor and basement of PSB. First floor teaching space includes three large lecture halls, two medium classrooms, and a clinical simulation laboratory space. This floor also includes SSPPS administrative offices of the Dean, Associate Deans, shared faculty offices for visiting and contract faculty, and space for administrative staff for the pharmacy curriculum, admissions, student affairs, business affairs, human resources, and grants management.

2nd to 4th Floors. Research laboratories and offices are located on the 2nd to 4th floors of PSB. The laboratory facilities are organized for molecular, cellular, chemistry, analytical, and computational research activities. Each floor has a conference room for small meetings. Administrative support staff for faculty are located near faculty offices on the 2nd to 4th floors of PSB.

The Space Committee of SSPPS advises on allocation and review of faculty and laboratory space within PSB based on research funding and personnel as well as type of research facilities needed. Space allocations will not substantively change with the establishment of departments.

Transition to Departments

Once the departments are approved, we will form search committees and recruit a department chair for each department. Initial chair appointments will result from internal recruitment. Further details regarding transition planning are in the department-specific sections below.
A. Summary

A.1 Justification

As noted above, establishing two departments will allow for improved faculty governance, better promotion and visibility of the school, enhanced support for fundraising, and substantially improved school representation across a wide variety of internal and external venues where department chairs participate. The proposed Department of Pharmacy Practice and Sciences is justified based on (1) excellence of the PharmD curriculum, (2) providing high quality patient care via innovative pharmacy practice models, (3) service to the university, national organizations, and local underserved communities, and breadth of research activities that span medication therapy management to health outcomes to clinical translational science.

The Division of Clinical Pharmacy faculty have developed innovative clinical pharmacy practice models within partner health institutions, which serve as a training ground for pharmacy students, residents, and fellows. UC San Diego SSPPS offers students an innovative curriculum leading to the Doctor of Pharmacy degree, with a steady state enrollment of 280 students, taught by a stellar clinical pharmacy faculty in collaboration with faculty from the proposed Department of Pharmaceutical Sciences. The PharmD curriculum provides opportunities for joint learning between UC San Diego pharmacy and medical students to develop a foundation in the biomedical sciences in common classes and shared volunteer community clinical experiences.

UC San Diego SSPPS provides a broad-based curriculum with strong foundational science, a diversity of clinical experiences and the opportunity for independent study in a variety of research and clinical settings. The proposed Department of Pharmacy Practice and Sciences supports the following major educational programs:

- Doctor of Pharmacy degree awarded in a four-year program
- Joint BS in Chemistry/PharmD degree awarded in a seven-year program in cooperation with UC San Diego's Department of Chemistry and Biochemistry
- Dual PharmD/PhD Program
- Master's Degree in Drug Development and Product Management

A.2 History

In 2016, under the direction of Dean McKerrow, SSPPS formed three divisions including Clinical Pharmacy, Pharmaceutical Chemistry and Pharmaceutical Sciences. Jan Hirsch, PhD was the inaugural Division Head of Clinical Pharmacy. In 2018, Dr. Hirsch was recruited to serve as the founding Dean of the University of California, Irvine School of Pharmacy and Pharmaceutical Sciences. Dr. Linda Awdishu was elected as the second Division Head and has served in this capacity since 2018. In 2021, her term was extended by Dean McKerrow, followed by a unanimous vote from clinical pharmacy faculty to extend the term with the onboarding of a new Dean, Dr. Brookie Best.

Note: The Division of Clinical Pharmacy (the proposed academic Department of Pharmacy Practice and Sciences) has a strong relationship with the UC San Diego Health System, but is distinct from the UC San Diego Health Department of Pharmacy. The UC San Diego Health Department of Pharmacy is a non-academic health system department led by Chief Pharmacy Officer Dr. Charles Daniels, who is also the SSPPS Associate Dean for Professional Practice. The UC San Diego Health System directly employs staff pharmacists in the Department of Pharmacy, who deliver care to patients across ambulatory and acute care settings and serve as non-salaried or affiliate faculty with SSPPS.

A.3 Vision & Goals

Vision

The vision of the proposed Department of Pharmacy Practice and Sciences is to deliver excellence in clinical pharmacy practice, teaching and research with emphasis on collaborative care and innovative practice models.

Overall Goals

The Department of Pharmacy Practice and Sciences follows the current strategic plan goals of the Division of Clinical Pharmacy of SSPPS. The Division of Clinical Pharmacy goals present in the existing strategic plan and outcomes to date are summarized below.

Specific Goals

Goal 1. Advance innovative pharmacy care models to optimize health.

a) Create and implement innovative pharmacy practice models.
1. Create new practice models within and outside of UC San Diego that improve patient outcomes.
2. Form partnerships within and outside of UC San Diego to expand the number of patients and providers benefiting from pharmacist services.
3. Involve trainees in the development and implementation of advanced pharmacy practice models.

b) Evaluate and improve patient-related outcomes of pharmacy practice models.
   1. Develop performance measurement systems to highlight the impact on patient care.
   2. Perform continuous quality improvement initiatives.
   4. Evaluate financial sustainability and value.

c) Disseminate outcomes of pharmacist practice models.
   1. Share outcomes with care teams and clinical faculty for continuous quality improvement.
   2. Present and publish individual and collective methods and outcomes within health.
   3. Involve trainees in dissemination.

Our division has established several innovative collaborative care practices with affiliated academic health systems receiving national recognition from organizations such as but not limited to Centers for Medicare and Medicaid, American Diabetes Association, California Pharmacists Association and the Joint Commission. Clinical faculty have received numerous awards from professional societies. We have disseminated this work by collectively publishing a manuscript describing the development and sustainment of these practices with the goal of fostering the expansion of pharmacist services: [https://doi.org/10.3390/pharmacy7040142](https://doi.org/10.3390/pharmacy7040142). Our collaborative care practices are supported financially from affiliated health care systems, which creates sustainability and furthers the mission to provide excellence in patient care. Faculty have contributed to the development of new clinical services and collaborative practices at affiliated health systems, the development and implementation of institutional medication guidelines in their respective expertise, online education for patients and the experiential training of students, residents and fellows. Our Student-Run pharmacy free clinics ([https://medschool.ucsd.edu/som/fmph/education/freeclinic/Pages/default.aspx](https://medschool.ucsd.edu/som/fmph/education/freeclinic/Pages/default.aspx)) continue to provide excellent care to underserved populations and provide a unique interprofessional learning experience for trainees. While the division has already been highly successful with clinical programs, establishing this department will improve our visibility and marketing of our successes with better external representation in Department Chair meetings at national professional organizations, and allow for Advancement support targeted to clinical innovations and initiatives.

Goal 2. Cultivate and expand collaborations with partners (local, state, national and global) to improve community health.

a) Educate patients, caregivers, healthcare professionals, and communities about health issues.

b) Collaborate with community partners to implement health and medication use programs.

c) Mentor and empower trainees for lifelong engagement with their communities.

The Division of Clinical Pharmacy has several unique educational programs focused on improving the health of the community. Several faculty provide group and individual education on chronic disease management. Faculty have developed online educational videos to educate patients and the public on medication therapy management. Our poison prevention and prescription drug abuse programs provide outreach education to elementary, middle and high schools in San Diego. The UC San Diego Student Run Free clinics provide free health care to the underserved population of San Diego. Our faculty and students provide medication management services within the UC San Diego Free Clinics. Several faculty collaborate with San Diego County Suicide Prevention Council to provide training on suicide prevention to students and pharmacists in California.

Goal 3. Achieve excellence in pharmacy related research that improves health.

a) Evaluate novel pharmacy practice models and interventions.

b) Investigate drug disposition and optimal medication use.

c) Conduct population-based studies of medication and health service utilization.

d) Evaluate contemporary training programs and teaching methods.

Our division is routinely recognized for excellence in clinical, drug disposition and economic/health policy research. Collectively, we have published 332 peer-reviewed manuscripts from 2018-2022 (Appendix III). Clinical faculty have received research related awards from Sternfel’s Prize for Drug Safety Innovation, State of California Tobacco Disease Related Research, California HIV Research Program, and the American Association of Colleges of Pharmacy. Clinical
Pharmacy faculty have been recognized for their contributions to the practice of pharmacy, research and professional societies through Fellow status with prestigious organizations such as but not limited to Academy of Hospice and Palliative Medicine, American College of Clinical Pharmacy, American Society of Consultant Pharmacists, and American Society of Nephrology. Drs. Bounthavong, Laura Hart and Kelly Lee were recently recognized with alumni awards from the University of Washington (MB, LH) and University of California, San Francisco (KL) Schools of Pharmacy. Clinical faculty have been successful in grant funding and serve as grant reviewers for the National Institutes of Health and Agency for Healthcare Research and Quality. Faculty have been invited to serve on Advisory Boards for the Board of Pharmaceutical Specialties, National Academy of Sciences, Engineering and Medicine, American Board of Internal Medicine, Food and Drug Administration, U.S. Department of Health and Human Services and the World Health Organization. Dr. Inmaculada Hernandez was accepted as a National Academy of Medicine Fellow in Pharmacy in 2022.

**Goal 4. Foster, strengthen, and sustain visionary faculty pharmacy practitioners.**

a) Recruit and retain exceptional faculty to create and maintain innovative practices.

b) Promote opportunities that expand leadership and professional development of faculty at the local, state, national and international levels.

c) Expand and enhance interprofessional collaborations.

The Division of Clinical Pharmacy aims to recruit visionary leaders who will serve as role models to Doctor of Pharmacy students. Our recent recruitments have been supported through Chancellor and UCOP Excellence searches. The cadre of clinical pharmacy faculty represent thought leaders in the profession of pharmacy and have been well recognized outside of the profession. To retain our faculty, SSPPS participates in the Health Sciences Faculty Mentor Training Program (FMTP). UC San Diego has an established Health Sciences FMTP to identify the best practices for faculty/faculty mentorship within UC San Diego Health Sciences. The formally structured program supports the progression and success of junior faculty. The program also seeks to improve junior faculty’s sense of belonging, engagement and fulfillment within their respective departments/divisions. The training of senior faculty in best practices for mentoring is overseen by Division Mentor Directors who are responsible for the overall FMTP program within their individual department/division. The program is supported by the Vice Chancellor for Health Sciences, the Chancellor's Office, and the Office of Equity, Diversity and Inclusion. Approximately 80% of clinical faculty have participated in this training program. Additionally, junior faculty are encouraged to attend the National Center for Leadership in Academic Medicine (NCLAM) which is a Health Sciences professional development program with a mentoring component for junior faculty at UC San Diego. NCLAM helps junior faculty develop skills appropriate for their academic career, implement a personal strategic plan and expand their network of colleagues within Health Sciences and the University. For senior faculty, additional leadership training programs include the UC San Diego Faculty Leadership Academy and the UC San Diego Health Leadership Academy and four clinical faculty have participated in these programs. The Faculty Leadership Academy is designed for senior faculty members considering future leadership positions and offers a broad understanding of the University as a dynamic and inclusive institution and the changing landscape of higher education. The UC San Diego Health Leadership Academy is a yearlong certificate program offering instructional insights of local, regional, and national experts in healthcare policy and economics, change management, finances and team leadership to Health Sciences faculty and UC Health staff. Currently, eight clinical faculty have senior leadership positions in the capacity of Dean, Associate Deans, and Division Head. Leadership opportunities for mid-level faculty are created through directorships. Several of our faculty hold directorships for residency programs, programs focused on simulation, student affairs, interprofessional and experiential education.

**B. Outline of Proposed Department of Pharmacy Practice and Sciences**

**B.1 Research Areas and Grants**

The broad areas of research of our clinical faculty include pharmacokinetics and drug disposition, clinical translational science focused on drug metabolism and toxicity, pharmacoepidemiologic studies of effectiveness and toxicity, health economics and outcomes, pharmacy practice-based outcomes, informatics, and scholarship of teaching and learning.

**Research Areas: Education, Innovative Practice Models, and Disease Management**

Scholarship of teaching and learning (SoTL). Several faculty are interested in understanding how students effectively learn core concepts within the pharmacy curriculum and which educational innovations are most effective.
Additional research efforts include identifying predictors of academic success in the pharmacy curriculum and wellness among pharmacy students and practitioners.

**Innovative practice development.** The Clinical Pharmacy division is focused on disseminating the clinical outcomes of pharmacist delivered care within the various areas of expertise, defining core clinical competencies for practice, improved patient outcomes, and factors affecting the well-being of health care professionals.

**Optimizing disease management.** Many of the Clinical Pharmacy faculty collaborate extensively with investigators across the UC San Diego Health Sciences and in partner health systems to optimize use of medications across diverse patient groups. SSPPS collaborators and synergistic areas of expertise include those detailed in Figure 6 below.

**Research Areas: Clinical and Translational Science**

**Perinatal and pediatric clinical pharmacology – antiretrovirals and antimicrobials.** Several division faculty lead research programs studying the pharmacokinetics of anti-retroviral and antimicrobial drugs in infants, children, adolescents, non-pregnant adults, and pregnant women. Determining medication exposure and correct doses to use in complex populations is critically important. Understanding penetration into compartments, including the central nervous system, the fetal compartment, and breast milk, provides guidance on appropriate drug therapy. Results are utilized to support national and international standard-of-care dosing guidelines in perinatal and pediatric patients living with HIV and for vancomycin guidelines endorsed by the American Society of Health-System Pharmacists, Infectious Diseases Society of America, and Pediatric Infectious Diseases Society and Society of Infectious Diseases Pharmacists. Key supporters and collaborators include the (1) International Maternal Pediatric Adolescent AIDS Clinical Trials (IMPAACT) Network, (2) the Maternal and Pediatric Precision in Therapeutics (MPRINT) Program, (3) the California Collaborative Treatment Group (CCTG), and (4) the HIV Neurobehavioral Research Program (HNRP).

**Pharmacokinetics and dosing in kidney disease and drug-induced kidney injury.** Division faculty co-leads The International Drug Induced Renal Injury Consortium (DIRECT) in collaboration with The International Serious Adverse Event Consortium (iSAEC), which aimed to define the clinical phenotype of drug induced kidney injury, develop predictive electronic health record models and identify pharmacogenomic variants associated with drug induced kidney injury. Within the O’Brien Center for Acute Kidney Injury Research (P30 DK079337) our faculty study novel biomarkers of acute kidney injury (AKI) in different sub-populations of patients, and they design observational cohort registries to evaluate clinical outcomes of patients with AKI.

**Effect of sex hormones on kidney function and antiretroviral concentrations.** Faculty are examining the effects of exogenous sex hormones on kidney function in transgender patients using pre-exposure prophylaxis for HIV with the goal of developing a gender-free estimating equation for kidney function. The work is funded by the California HIV/AIDS Research Program (CHRP) and was the recipient of the Janis V. Giorgi Memorial Award from CHRP. Additional studies in the transgender population are to evaluate how endogenous measures of hormone concentrations affect tenofovir drug concentrations when switching from one product to another.

**Drug-metabolizing enzyme and transporter activity.** Another research area focuses on estimating in vivo, real-time, drug-metabolizing enzyme and transporter activity to evaluate drug-drug interactions, as well as evaluating pharmacokinetic and pharmacodynamic variability of opioids in patients with cancer.

**Pharmacomicrobiomics.** In collaboration with faculty from the other proposed department, division faculty study metabolomics to investigate factors influencing the variability of drug metabolism and pharmacokinetics. The team is interested in the intersection of drugs and the gut microbiome – pharmacomicrobiomics. Through the UC San Diego Center of Excellence in Therapeutics for MPRINT (Maternal and Pediatric Precision in Therapeutics) Hub, faculty are investigating the impact of antibiotic exposure through breastfeeding on the infant microbiome, metabolome, and development. Other work has included investigating the impact of altering the gut microbiome with antibiotics on drug metabolizing activity and using probe compounds such as midazolam and cyclosporine to predict activity of CYP3A4, as well as clinical pharmacology investigations with immunosuppressive agents. This research program is also investigating the use of noninvasive techniques to monitor drugs and other chemicals in pregnancy, infancy, and healthcare workers.

**Research Areas: Pharmacoepidemiology, Pharmacoeconomics, and Health Outcomes Research**
Applied econometrics and academic detailing. Division faculty study pharmacoeconomics, program and implementation evaluations, applied econometrics, and evidence-synthesis using Bayesian methods. Additional areas of study include evaluating academic detailing’s impact on aligning provider’s behavior with evidence-based practice, particularly with the opioid epidemic.

Pharmacoeconomics of anticoagulation. This research program is funded by K01 and R01 awards, and studies patient and system-level determinants of oral anticoagulation use in atrial fibrillation, along with examining pandemic disruptions of atrial fibrillation care with a focus on identifying disparities in care among underrepresented patient groups. This work has identified the safety risks and resumption of anticoagulation in the event of bleeding.

Pharmaceutical pricing. Research in pharmaceutical pricing estimates the effect of rising manufacturer discounts in offsetting increases in list prices of drugs, examines the extent rising drug prices are due to innovation versus inflation, and demonstrates changes in drug pricing during shortages. Additionally, disparities in access to vaccinations among underrepresented groups during the COVID19 pandemic have been documented, and applied geographic information systems (GIS) methods are being used to quantify disparities in access to health care facilities.

Antiretroviral and antiviral pharmacoepidemiology. Department faculty are evaluating hepatitis C medication use and its effects on the HIV care cascade within the Veterans' Affairs population co-infected with both HIV and hepatitis C to ultimately develop a predictive Markov model to identify mechanisms to achieve micro-elimination of hepatitis C within this population. Faculty are leading the PROMISE-US registry, which aims to evaluate real-world safety and effectiveness of ibalizumab in patients with highly treatment-resistant HIV infection.

Safe medication systems and quality care. This research program focuses on pharmacoeconomics, safe medication systems, medication use quality, and quality pharmacy patient care. Recent work has evaluated the role of technologies in medication error reduction and patient-pharmacist interaction. He also examines use of multihospital data in drug costs and improved outcomes.

Optimizing medication use in older adults. Division faculty aims to optimize medication use in older adults, particularly using pharmacoepidemiologic methods to examine risks and patterns of medication use in older adults. Research to date has specifically focused in the areas of central nervous system-active medications, falls, and dementia.

The Clinical Pharmacy Division hosts the Applied Pharmacoeconomic and Outcomes Research Forum annually, which was developed to (1) discuss commonly encountered obstacles to conducting or utilizing results of applied pharmacoeconomic studies and explore solutions from various perspectives of the health care system, and (2) create an environment and foundation to foster the creation of a Southern California Pharmacoeconomic and Outcomes Research Interest Group.

Grants.

The faculty of the Department are funded through awards from the National Institutes of Health (NIH), collaborating academic institutions across the US, private foundations, industry and support for clinical efforts (See Appendix II). Total funding from grants, contracts, gifts, and clinical service support awarded to faculty of this proposed Department at SSPPS currently totals more than $3.7 million in direct and indirect costs. These grants support research, training of pharmacy students, undergraduate students, residents and fellows, and provide service to communities across San Diego.

B.2 Education

The faculty of the proposed Department of Pharmacy Practice and Sciences participates broadly in the educational mission of SSPPS and UC San Diego through teaching health sciences pharmacy and medical students, residents, fellows, and visiting scientists from around the world. Faculty teaching in the educational programs of SSPPS and joint programs with collaborating Schools and Departments at UC San Diego are summarized below.

SSPPS Doctor of Pharmacy (PharmD)

The program leading to the Doctor of Pharmacy degree provides education and training for practice in all environments, today and in the future. These include hospitals, clinics, home care, the pharmaceutical industry and community practice. In small first-year classes, students study the basic and pharmaceutical sciences and the practice of
The majority of courses in the PharmD curriculum are taught by clinical pharmacy faculty in the proposed Department of Pharmacy Practice and Sciences. Additionally, clinical faculty offer electives in various specialties such as but not limited to Critical Care, Oncology, Pain and Palliative Care, Psychiatry, and Solid Organ Transplantation. Clinical faculty serve as preceptors to students in Introductory Pharmacy Practice Experiences (IPPEs) and Advanced Pharmacy Practice Experiences (APPEs). Clinical pharmacy faculty serve as formal faculty advisors to students in the PharmD program and as research mentors for the independent research project, which is a graduation requirement. Required (SPPS 201 through 403) and elective (SPPS 265 through 503) courses for the pharmacy curriculum taught by faculty of the proposed Department of Pharmacy Practice and Sciences are listed here:

- SPPS 200A Community Pharmacy IPPE
- SPPS 200B Institutional Health System IPPE
- SPPS 200C Health-related Service Learning IPPE
- SPPS 201 Pharmacy Practice I
- SPPS 202 Pharmacy Practice II
- SPPS 202A Concepts in Pharmacy Practice
- SPPS 203 Pharmacy Practice III
- SPPS 204 Law and Ethics
- SPPS 205 Pharmacy Informatics
- SPPS 206 Study Design & Biostatistics I
- SPPS 207 Introduction to Health Care Systems and Policy
- SPPS 208 Study Design & Biostatistics II
- SPPS 209 Applied Pharmacoeconomics
- SPPS 210 Required Research Project
- SPPS 211A Co-Curriculum I
- SPPS 211D Co-Curriculum IV
- SPPS 212A Therapeutics I
- SPPS 212B Therapeutics II
- SPPS 212C Therapeutics III
- SPPS 212D Therapeutics IV
- SPPS 213A Advanced Professional Practice Lab I
- SPPS 213C Advanced Professional Practice Lab III
- SPPS 219 Pharmacogenomics
- SPPS 224 Biopharmaceutics
- SPPS 226 Pharmacokinetics
- SPPS 231 Cardiovascular System I
- SPPS 234 Renal System I
- SPPS 247 Principles of Pharmacology and Physiology I
- SPPS 248 Principles of Pharmacology and Physiology II
- SPPS 249 Principles of Pharmacology and Physiology III
- SPPS 400A Acute Care APPE
- SPPS 400B Acute Care APPE
- SPPS 401A Ambulatory Care APPE
- SPPS 401B Ambulatory Care APPE
- SPPS 402 Community Pharmacy APPE
- SPPS 403 Hospital/Health System APPE
- SPPS 265 Geriatric Pharmacotherapy
- SPPS 269 Pain & Palliative Care
- SPPS 271 Current Concepts in Pharmacy Legislation
- SPPS 274 Critical Care Medicine
- SPPS 278 Free Clinic Manager
- SPPS 279 Prescription Drug Abuse Prevention
Figure 5. Overview of the SSPPS PharmD Program

**Educational Experience At-A-Glance**

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<td><strong>Leadership, Innovation/Entrepreneurship, Professionalism, Self-Awareness</strong></td>
<td><strong>Pharmacy Practice</strong></td>
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<td><strong>Scientific Discovery Project</strong></td>
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<td><strong>Leadership, Innovation/Entrepreneurship, Professionalism, Self-Awareness</strong></td>
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<td><strong>Pharmacy Practice</strong></td>
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<td></td>
<td><strong>Study Design &amp; Biostatistics, Law &amp; Ethics, Pharmaceutics, Pharmaceutical Chemistry</strong></td>
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<td><strong>Pharmacy Practice</strong></td>
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**Second Year**

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**Third Year**

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**Fourth Year**

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<td><strong>Dissemination</strong></td>
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Students complete 2 Elective and 5 Core APPE rotations. Core APPE include Community, Health Systems, Acute Care, Ambulatory Care, and either Acute or Ambulatory Care.

Updated: Aug. 27, 2020

The curriculum is continuously being improved and is subject to change.
The PharmD curriculum has had exceptional outcomes catapulting SSPPS into the top five ranking in the State of California and top 20 pharmacy schools in the United States within its first 20 years. The PharmD national licensure exam (NAPLEX) average 5-year pass rate is 97% for SSPPS compared to 85% national average. Additionally, we have 99% on time graduation rate for the past 5 years. Over half of our graduates pursue optional residency or fellowship training. Our average 5-year residency match rate is 77% compared to an average of 69% for the state of California. These outstanding outcomes are the result of stellar students taught by exceptional faculty. Eight clinical faculty (Atayee, Awdishu, Best, Brandl, Fricovsky, Mnatzaganian, Morello, and Namba) have received the UC San Diego Campus Distinguished Teaching Award. Dr. Katharina Brandl has notably received the SOM Kaiser Teaching Award four consecutive years in a row and is the inaugural recipient of the UC San Diego School of Medicine Dean's Award for Excellence in Teaching.

Residency and Fellowship Programs
Pharmacy practice residencies provide opportunities for Pharm.D. graduates to obtain in-depth clinical experience, teaching experience in the clinical environment and administrative training. Specialty residencies and fellowships allow for highly concentrated research and practice experience in specialty areas of pharmacy practice. Clinical pharmacy faculty contribute substantially to the precepting of UC San Diego Health Department of Pharmacy PGY1 and PGY2 residents (from the following programs: Acute Care, Ambulatory Care, Critical Care, Health-System Pharmacy Administration, Infectious Diseases, Informatics, Internal Medicine, Oncology, Psychiatry, and Solid Organ Transplantation), including serving as clinical preceptors, faculty advisors, Residency Program Directors, teaching mentors, and research project mentors. Further, faculty serve as directors of SSPPS-led residencies and fellowships in collaboration with community/industry partners, including:

- SSPPS-PureCare Community Pharmacy Specialty Residency
- SSPPS-Mirati Medical Affairs-Oncology Postdoctoral Fellowship
- SSPPS-Pfizer Clinical Pharmacology-Oncology Postdoctoral Fellowship

SSPPS Master of Science in Drug Development and Product Management
In 2018, Drs. Joseph Ma and Williams Ettouati, in collaboration with other SSPPS faculty, launched a Master’s degree in Drug Development and Product Management (DDPM). The MS in DDPM has three aims: first, to give experienced professionals insight into the process of successful drug product development and deployment; second, to endow students with requisite knowledge and skill to collaborate effectively in the ongoing management of drug products; and third, to provide a solid, practical bridge to employment opportunities in pharmaceutical, biotechnology, and managed care industries or related government agencies such as the US Food and Drug Administration (FDA) or the European Medicines Agency (EMA).

Distinctive features of the program include instruction by a combination of faculty who possess scholarly understanding and industry experience; provide a case-based and project-oriented approach to learning, with options in professional focus; course delivery; exposure to student colleagues with varied professional and international backgrounds; and connections with employers featured as course chairs and guest lecturers.

The SSPPS Masters of DDPM has matriculated 98 students in the period of 2018-2022. Sixty-four alumni of the program report the following outcomes:

- 45 acquired new or better positions in different fields with different employers
- 17 remained with their employers and received promotions
- 1 is pursuing a PhD
- 1 is pursuing an MBA

UC San Diego School of Medicine, Doctor of Medicine (MD)
Clinical pharmacy faculty serve as course chairs for School of Medicine Pharmacology courses, small group leaders for pharmacology thread sessions for medical students, lecturers in their topic expertise, and for interprofessional simulation
events in the Practice of Medicine courses. Faculty also contribute to clinical precepting of medical students, residents and fellows rotating through UC San Diego Health.

**PhD Training at UC San Diego Health Sciences**

Translational research faculty in the department have served as committee members (minor prop, thesis) for PharmD/PhD students in Pharmaceutical Sciences. Given the recruitment of stellar faculty with expertise in health economics and outcomes, we hope to expand the group with additional recruitments with expertise in health disparities research. Our current PhD training programs are housed within the Biomedical Sciences. We hope to expand graduate training further in the areas of clinical pharmacology and health economics and outcomes, particularly to meet the needs of our PharmD/PhD students. There is growing interest in the development of a joint PhD in Health Economics and Outcomes Research with SSPPS and Wertheim School of Public Health.

**B.3 Justice, Equity, Diversity, and Inclusion**

Justice, equity, diversity, and inclusion have been a focus for clinical faculty resulting in numerous notable accomplishments within the last 5 years. Our JEDI efforts span across the areas of education, faculty recruitment, development, and retention to research in health equity. Our efforts have forged relationships not only within health sciences but also with general campus departments like sociology and education. To maintain our momentum, we plan to appoint a JEDI Director for the proposed department. The JEDI Director will oversee the efforts across the various areas and liaise with the corresponding senior leader (i.e. Associate Dean for Admissions, Associate Dean for Research and Innovation, Program Manager for Diversity and Community Initiatives, etc.) to provide guidance, input from clinical faculty or take an active leadership role. The JEDI Director will be our representative to Health Sciences and General Campus JEDI initiatives.

**Curriculum**

Dr. Eduardo Fricovsky was selected as a UC San Diego Changemaker Fellow in the Anti-Racist Pedagogy Learning Community for the 2021-2022 year to incorporate Anti-Racist pedagogy into the PharmD curriculum and his project focused on creating an Antiracism/Health Equity workshop for first year pharmacy students. This workshop examines the history of racism, the impact on marginalized groups in the USA, social determinants of health, and the impact of racism on life expectancy, health outcomes, and most recently COVID-19 infection.

Drs. Jennifer Namba, Eduardo Fricovsky, Laura Hart, Linda Awdishu, and Mr. Dominic Cooper have developed new HEART workshops in the Advanced Professional Practice course in the PharmD curriculum, which feature topics of micro-aggressions, health disparities based on race/ethnicity, and gender identity in patient care. Dr. Laura Hart spearheaded efforts to integrate curriculum on the care of the LGBTQIA+ community in the first year Pharmacy Practice course in the PharmD curriculum.

Clinical pharmacy faculty have supported and mentored students in the establishment of a student organization; the Student National Pharmaceutical Association (SNPhA). The purpose of SNPhA is to organize and execute programs to improve health, education, and social environment of minority communities. This student organization will further our efforts to improve care in underrepresented or minoritized communities.

**Faculty Diversity**

While many efforts are underway to increase the diversity of the student body, we identified a gap between the percentage of students from underrepresented minorities and faculty from underrepresented minorities who teach and mentor pharmacy students. To enhance the diversity of our faculty, we collaborated on excellence searches in diversity and the Advancing Faculty Diversity award from the University of California, Office of the President.

In 2020, Dr. JoAnn Trejo with support from the Chancellor and Vice Chancellor of Health Sciences launched the Health Sciences Excellence in Diversity search and we collaborated in this search successfully recruiting Dr. Inmaculada Hernandez into a ladder rank position within the Division of Clinical Pharmacy. Dr. Inmaculada Hernandez’s expertise is focused on health economics, outcomes, and disparities research studying vaccine equity and drug pricing disparities experienced by underrepresented minorities with attention to the role of the community pharmacist.

In 2020, Dr. Linda Awdishu collaborated with Drs. Thandeka Chapman (African American Studies; AAS), Makeba Jones (AAS), and Ivan Evans (Sociology) with the support of VC EDI Becky Petitt on the Advancing Faculty Diversity grant. This grant was awarded by the University of California Office of the President to support a cluster hire of faculty across STEM and Health Sciences departments whose research was focused on health disparities faced by African Americans or the African Diaspora. This cluster hire will foster a community of scholars with shared perspectives and experiences aimed to improve the campus climate. This initiative has resulted in the successful recruitment of faculty in
biological sciences, engineering, chemistry, public health and most recently SSPPS. We successfully recruited Dr. Jacinda Abdul Mutakabbir as an Assistant Professor of Clinical Pharmacy. Her research is focused on vaccine equity and antimicrobial resistance patterns in African Americans. Dr. Abdul Mutakabbir will be developing and teaching a course to undergraduate students in the African American Studies Major and Minor degree programs and will serve as a research mentor to undergraduate students of underrepresented minorities who are interested in health professions. We hope to educate undergraduate students on the profession of pharmacy and improve the percentage of UC San Diego undergraduate students from underrepresented groups applying to our pharmacy school.

Two of our clinical faculty, Drs. Eduardo Fricovsky and Inmaculada Hernandez are members of the UC San Diego Hispanic Center of Excellence. They serve as faculty mentors and research mentors to students of Hispanic heritage. Dr. Eduardo Fricovsky leads the Research Methodology Training Laboratory, which provides a summer experience to middle- and high school students from underrepresented groups. He was recently asked to participate in the Mentorship for Advancing Diversity in Undergraduate Research on Aging (MADURA) Program, a training opportunity funded by the NIH National Institute on Aging. Dr. Fricovsky will be a small group leader mentoring underrepresented students in weekly sessions.

B.4 Clinical Highlights

Our faculty have a wide breadth of expertise including but not limited to cardiology, community pharmacy, diabetes, geriatrics, health policy, hepatology, infectious disease, internal medicine, nephrology, pain and palliative care, pediatrics, pharmacoconomics, pharmacogenomics, pharmacokinetics, pharmacy administration, psychiatry, solid organ transplantation and primary care for underserved populations. Pharmacy Practice expertise areas are shown in Figure 6 below.

Figure 6. Pharmacy Practice Areas of Expertise

UC San Diego Health serves as a primary site for 14 clinical faculty (Atayee, Awdishu, Daniels, Feist, Hart, Humber, Lee, Ma, Mnatzaganian, Namba, Painter, Saunders, Singh, Tsunoda) practicing in cardiology, diabetes, geriatrics, family medicine, nephrology, oncology, pain and palliative care, pharmacy administration, psychiatry, solid organ transplantation. Notably, Dr. Charles Daniels is the Chief Pharmacy Officer for UC San Diego Health. Two faculty (Morello, Kneebusch) practice at the Jennifer Moreno Veterans Affairs San Diego Healthcare System (JMVASDHS) in diabetes and psychiatry, respectively, and Dr. Mark Bounthavong at the Veterans Health Administration Pharmacy Benefits Management
National Academic Detailing Service and VA Health Economics Resource Center. Drs. Fricovksy and Luli practice at the UC San Diego Student-run Free Clinics. Dr. Patel has established a practice in UC San Diego Student Health and in the UC San Diego HIV Antiretroviral Research Center. Dr. Zaid Yousif, a newly appointed faculty is establishing a novel practice site with Takeda Pharmaceuticals which will represent our first pharmaceutical industry based pharmacy practice site. We are currently exploring clinical practice sites with other affiliated health systems to position faculty in health systems where students are rotating through APPEs in their fourth year.

B.5 Space Allocation
All clinical faculty are assigned an office on campus and designated administrative support staff. The majority of clinical faculty are in the Medical Teaching Facility first floor offices or in the Ivy and Laurel facilities adjacent to SSPPS. Clinical faculty in leadership roles or those with wet or dry laboratory space needs are located within the Pharmaceutical Sciences Building. Clinical faculty with wet or dry laboratory space allocation (PIs: Best, Hernandez) exceed the thresholds set by health sciences for space productivity. All clinical faculty have office space within walking distance to SSPPS to facilitate teaching and meeting with students.

B.6 Equipment
The faculty of the proposed Department of Pharmacy Practice and Sciences who engage in translational and computational research have the requisite equipment in their own laboratory space or in the space of key collaborators, including but not limited to mass spectrometry, HPLC, and computational tools, servers and databases.

B.7 Department Organization
The proposed Department of Pharmacy Practice and Sciences will be one of two Departments of SSPPS (the organizational chart was shown above in Figure 2). The Department Chairs work with the Dean of SSPPS, together with Associate Deans, to conduct high quality education, research, and clinical pharmacy functions. Administrative support for the two Departments is formatted as SSPPS-wide functions for business and fiscal affairs, grants management and fund managers, human resources, curriculum, admissions and student affairs, faculty support, and related.

C. Faculty Appointment and Commitment
The proposed Department of Pharmacy Practice and Sciences consists of 27 salaried faculty members, and an additional 1 proposed new appointment (Table 1). We have one recruitment in the Advancing Faculty Diversity search, which will be reopened in Fall 2023. Additionally, we are participating in the NIH FIRST Award recruitments led by Health Sciences AVC JoAnn Trejo. Of the 27 appointed faculty, the distribution by series includes: 14 in the Health Sciences Clinical, 11 in Clinical X, 1 in the teaching professor, and 1 in the ladder rank. The distribution of faculty by rank includes 14 full Professors, 7 Associate Professors, and 5 Assistant Professors. Our new recruitments will be in the proposed rank of Assistant Professor. The faculty biographies are included in Appendix I.

Table 1: Faculty of the Proposed Department of Pharmacy Practice and Sciences

<table>
<thead>
<tr>
<th>Name</th>
<th>Series</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacinda Abdul-Mutakabbir</td>
<td>Clinical X</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Rabia Atayee, PharmD</td>
<td>Clinical X</td>
<td>Professor</td>
</tr>
<tr>
<td>Linda Awdishu, PharmD, MAS</td>
<td>Clinical X</td>
<td>Professor</td>
</tr>
<tr>
<td>Brookie Best, PharmD, MAS</td>
<td>Clinical X</td>
<td>Professor</td>
</tr>
<tr>
<td>Mark Bounthavong, PharmD, PhD</td>
<td>Clinical X</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Katharina Brandl, PhD</td>
<td>Lecturer with Security of Employment</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Charles Daniels, PhD</td>
<td>HS Clinical</td>
<td>Professor</td>
</tr>
<tr>
<td>Ashley Feist, PharmD</td>
<td>HS Clinical</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Eduardo Fricovsky, PharmD</td>
<td>HS Clinical</td>
<td>Professor</td>
</tr>
<tr>
<td>Laura Hart, PharmD, MS</td>
<td>HS Clinical</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Inmaculada Hernandez, PharmD, PhD</td>
<td>Ladder Rank</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Douglas Humber, PharmD</td>
<td>HS Clinical</td>
<td>Professor</td>
</tr>
<tr>
<td>Jamie Kneebusch, PharmD</td>
<td>HS Clinical</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Jennifer Le, PharmD, MAS</td>
<td>Clinical X</td>
<td>Professor</td>
</tr>
<tr>
<td>Kelly Lee, PharmD, MAS</td>
<td>Clinical X</td>
<td>Professor</td>
</tr>
</tbody>
</table>
D. Financial Package

D.1. 5-year projected fiscal plan

D.1.a. Current fiscal status.

The proposed Department of Pharmacy Practice and Sciences is currently financially supported by the School, SSPPS, in full, to cover faculty salaries, teaching support, administrative support, and related functions necessary for education, research, and service. Primary revenue sources into the school that will be used to support this Department are tuition and professional fees for the PharmD degree program, grants and contracts, effort support for clinical service, and philanthropy. The Department Chair will be a critical partner with the Dean and the Advancement team to focus philanthropic efforts in areas of highest relevance to the Pharmacy Practice and Sciences faculty strengths, such as grateful patients, innovative practice and training models, scholarship of teaching and learning, and clinical and outcomes research. Likewise, the Department Chair will work closely with the Associate Dean for Research and Innovation to identify new research and industry funding avenues for educational, clinical and research programs.

In summary, fiscal support of the activities of the proposed Department of Pharmacy Practice and Sciences is in place at SSPPS. See Tables 2 and 3 below for financial summaries of prior years and projected future years. Values in Table 1 are approximate, showing the estimated past revenues and expenditures if this division had been a department. For clinical faculty who receive support from other departments or health system units for clinical service, only the percent effort supported by SSPPS are included in the revenue and expenses of the tables below. Similarly, only the grants that are managed in SSPPS are included in the tables below. Grants managed by other partner units do not appear in Table 2. For a more complete list of grant funding that clinical faculty bring into the University, please see Appendix II.
Table 2. Summary of Revenue and Expenditures, 2018 - 2023

<table>
<thead>
<tr>
<th>REVENUE</th>
<th>FY 18/19</th>
<th>FY 19/20</th>
<th>FY 20/21 (New Systems Implemented)</th>
<th>FY 21/22</th>
<th>FY 22/23 (Projected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract and Grants</td>
<td>332,207</td>
<td>503,103</td>
<td>349,545</td>
<td>1,403,585</td>
<td>1,481,068</td>
</tr>
<tr>
<td>Gift/Endowments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core CBO Allocations</td>
<td>3,861,120</td>
<td>4,069,245</td>
<td>4,242,916</td>
<td>4,363,323</td>
<td>4,844,783</td>
</tr>
<tr>
<td>Self-Supporting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Revenues</td>
<td>4,617</td>
<td>(71,763)</td>
<td>2,160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Agreements</td>
<td>97,660</td>
<td>145,955</td>
<td>164,139</td>
<td>191,147</td>
<td>97,714</td>
</tr>
<tr>
<td>Department Assessments</td>
<td>(4,341)</td>
<td>(6,294)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VC/Dean Allocations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL REVENUE</strong></td>
<td><strong>4,291,262</strong></td>
<td><strong>4,640,246</strong></td>
<td><strong>4,758,760</strong></td>
<td><strong>5,958,055</strong></td>
<td><strong>6,423,565</strong></td>
</tr>
<tr>
<td>EXPENSES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Salaries &amp; Benefit Expenses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic Salaries</td>
<td>2,774,071</td>
<td>2,948,835</td>
<td>3,161,013</td>
<td>3,212,342</td>
<td>3,467,977</td>
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<tr>
<td>Non-Academic Salaries</td>
<td>7,944</td>
<td>14,720</td>
<td>2,727</td>
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<tr>
<td>Employee Benefits</td>
<td>751,773</td>
<td>799,134</td>
<td>875,601</td>
<td>938,004</td>
<td>1,088,945</td>
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<tr>
<td><strong>TOTAL SALARIES &amp; BENEFITS</strong></td>
<td><strong>3,533,788</strong></td>
<td><strong>3,762,690</strong></td>
<td><strong>4,039,341</strong></td>
<td><strong>4,150,346</strong></td>
<td><strong>4,556,922</strong></td>
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<tr>
<td><strong>Non-Payroll Expenses</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies &amp; Materials</td>
<td>139,510</td>
<td>142,300</td>
<td>145,146</td>
<td>148,049</td>
<td>151,010</td>
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<tr>
<td>Other Expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared Services</td>
<td>195,765</td>
<td>178,976</td>
<td>161,156</td>
<td>164,928</td>
<td>136,851</td>
</tr>
<tr>
<td>Overhead - IDC</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest Expense</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL NON-PAYROLL EXPENSES</strong></td>
<td><strong>335,275</strong></td>
<td><strong>321,276</strong></td>
<td><strong>306,302</strong></td>
<td><strong>312,977</strong></td>
<td><strong>287,861</strong></td>
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<td><strong>TOTAL EXPENSES</strong></td>
<td><strong>3,869,064</strong></td>
<td><strong>4,083,966</strong></td>
<td><strong>4,345,643</strong></td>
<td><strong>4,463,323</strong></td>
<td><strong>4,844,783</strong></td>
</tr>
<tr>
<td>NET SURPLUS/DEFICIT</td>
<td><strong>422,198</strong></td>
<td><strong>556,280</strong></td>
<td><strong>413,116</strong></td>
<td><strong>1,494,732</strong></td>
<td><strong>1,578,782</strong></td>
</tr>
<tr>
<td>Other Transfers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VC/Dean Transfers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL OTHER TRANSFERS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NET AFTER TRANSFERS</strong></td>
<td><strong>422,198</strong></td>
<td><strong>556,280</strong></td>
<td><strong>413,116</strong></td>
<td><strong>1,494,732</strong></td>
<td><strong>1,578,782</strong></td>
</tr>
</tbody>
</table>
Table 3. Projections of Revenue and Expenditures, 2024 - 2028

<table>
<thead>
<tr>
<th></th>
<th>FY 23/24</th>
<th>FY 24/25</th>
<th>FY 25/26</th>
<th>FY 26/27</th>
<th>FY 27/28</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract and Grants</td>
<td>338,851</td>
<td>345,628</td>
<td>352,540</td>
<td>359,591</td>
<td>366,783</td>
</tr>
<tr>
<td>Gift/Endowments</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Core CBO Allocations</td>
<td>4,130,752</td>
<td>4,310,115</td>
<td>4,496,556</td>
<td>4,690,339</td>
<td>4,872,443</td>
</tr>
<tr>
<td>Self-Supporting</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Other Revenues</td>
<td>4,709</td>
<td>4,804</td>
<td>4,900</td>
<td>4,998</td>
<td>5,098</td>
</tr>
<tr>
<td>Service Agreements</td>
<td>99,613</td>
<td>101,605</td>
<td>103,637</td>
<td>105,710</td>
<td>107,824</td>
</tr>
<tr>
<td>VC/Dean Allocations</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td><strong>TOTAL REVENUE</strong></td>
<td>4,619,496</td>
<td>4,807,634</td>
<td>5,003,026</td>
<td>5,205,939</td>
<td>5,397,355</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Expenses</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries &amp; Benefit Expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic Salaries</td>
<td>2,857,293</td>
<td>2,943,012</td>
<td>3,031,302</td>
<td>3,122,241</td>
<td>3,215,909</td>
</tr>
<tr>
<td>Non-Academic Salaries</td>
<td>8,182</td>
<td>8,427,79</td>
<td>8,681</td>
<td>8,941</td>
<td>9,209</td>
</tr>
<tr>
<td>Employee Benefits</td>
<td>931,478</td>
<td>1,018,282</td>
<td>1,109,457</td>
<td>1,205,185</td>
<td>1,286,363</td>
</tr>
<tr>
<td><strong>TOTAL SALARIES &amp; BENEFITS</strong></td>
<td>3,796,553</td>
<td>3,969,722</td>
<td>4,149,440</td>
<td>4,336,368</td>
<td>4,511,481</td>
</tr>
<tr>
<td>Non-Payroll Expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies &amp; Materials</td>
<td>142,300</td>
<td>145,146</td>
<td>148,049</td>
<td>151,010</td>
<td>154,030</td>
</tr>
<tr>
<td>Other Expenses</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shared Services</td>
<td>199,681</td>
<td>203,674</td>
<td>207,748</td>
<td>211,903</td>
<td>216,141</td>
</tr>
<tr>
<td>Overhead - IDC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Interest Expense</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL NON-PAYROLL EXPENSES</strong></td>
<td>341,981</td>
<td>348,820</td>
<td>355,797</td>
<td>362,913</td>
<td>370,171</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td>4,138,934</td>
<td>4,318,542</td>
<td>4,505,237</td>
<td>4,699,280</td>
<td>4,881,653</td>
</tr>
<tr>
<td><strong>Net Surplus/Deficit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Transfers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VC/Dean Transfers</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL OTHER TRANSFERS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net After Transfers</strong></td>
<td>480,562</td>
<td>489,092</td>
<td>497,789</td>
<td>506,658</td>
<td>515,702</td>
</tr>
</tbody>
</table>

**D.1.b. FTE allocation.**

The proposed Department of Pharmacy Practice and Sciences currently holds two FTEs.

**D.1.c. Non-academic staff.**

Non-academic staff provide support for teaching and education, research, and service for the proposed Department. These staff are already present at SSPPS and are experienced in high quality support of SSPPS academic activities. Our staff provide support for student affairs and curriculum, grants management and fund managers, support of faculty teaching, human resources, and related. These staff will support activities of the new Department.

**D.2. Philanthropy**

The creation of a department will enhance visibility, increase engagement with development officers, and improve fundraising in the areas of industry-academia partnerships for research and post-graduate training, endowed chairs, and “Grateful Patients”.

Faculty in the proposed Department of Pharmacy Practice and Sciences have engaged with numerous pharmaceutical industry partners in the development of new post-graduate fellowship opportunities in Clinical Pharmacology, Medical Affairs or Health Economics. Most recently, a collaboration with Mirati Therapeutics resulted in a new post-graduate Fellowship in Medical Affairs, which was filled with an SSPPS alum as the first fellow. Our proposed
The department aims to engage more pharmaceutical industry partners in the development of additional post-graduate fellowship opportunities for PharmD alumni.

Faculty have collaborated with Sony Electronics to fundraise for the development of a new clinical simulation laboratory. We are developing new educational technology in collaboration with Sony Electronics, which will provide opportunities for students to interact in an immersive clinical environment with real-time feedback. This collaboration resulted in the donation of equipment, unrestricted gifts, and a research contract.

Historically, “Grateful Patient” philanthropy efforts in health sciences have focused on physicians. Given the many clinical pharmacy faculty practicing in patient-facing roles, there is an opportunity to develop a philanthropy strategy focused on grateful patients. Currently, one clinical faculty has received grateful patient donations to support educational efforts in health screening of the San Diego County. The creation of a departmental website and support from the development office will assist in philanthropic efforts.

E. Transition Plans for the Proposed Department of Pharmacy Practice and Sciences

Transition to the proposed Department of Pharmacy Practice and Sciences, from the Division of Clinical Pharmacy, is expected to occur smoothly since the activities of the Department are currently in place in the Division. These areas are provided below with reference to the earlier sections of this proposal that describe the indicated activities of the proposed Department.

Transition will involve selection of the Chair of the Department of Pharmacy Practice and Sciences and a Director of Justice, Equity, Diversity, and Inclusion. These two positions will be implemented upon approval of the proposed new Department.

The areas of Education, Resources, Research and Laboratory Facilities, Industry Relationships, and Contributions to the University, State, and others during transition to the new Department will continue to operate in current, ongoing manner that are now conducted by the Division of Clinical Pharmacy. Therefore, the transition to the new Department will occur smoothly.

E.1. Education

The Department will conduct educational activities as described in section B.2 for Educational Plan. Faculty will continue high caliber training of pharmacy students jointly with medical students, graduate students for PhD and Master’s degrees, postdoctoral residents, fellows, undergraduate and high school students, and visiting scientists.

E.2. Resources

The new Department will be provided resources that currently support teaching, research, and service activities of the Division of Clinical Pharmacy, as described in section D.1.a for current fiscal status. Notably, the School (SSPPS) will provide the Department with $50,000 per year for 5 years, as a seed resource for Departmental activities. This Departmental resource will be managed by the Chair for the benefit of faculty and students.

E.3. Research and Laboratory Facilities

During transition, the new Department’s office, research and laboratory facilities will continue as they are currently formatted for faculty of the Division of Clinical Pharmacy, as described in section B.1.5. for space allocation. Use of research laboratory space is reviewed by the SSPPS space committee on a routine basis to provide appropriate allocation of space required for ongoing research programs.

E.4. Industry Relationships

The new Department will continue ongoing industry relationships in teaching, research, and service to the University. Local industry and affiliated health-system experts routinely participate in our PharmD and Masters training programs and courses. Companies sponsor fellowships and internships for our trainees and provide training sites for APPE and fellowship rotations.

E.5. Contributions of the Proposed Department of Pharmacy Practice and Sciences to the University, State, National, and International Communities

The faculty of the proposed Department are actively engaged in contributing to teaching, research, and service in extensive collaborations with colleagues throughout the UC San Diego campus, San Diego research institutions and industry, Southern California health systems and community pharmacy partners, non-profit organizations, California statewide translational programs (academic, industry, and state), and national translational programs (academic, industry, government, private foundations). These broad interactions of the proposed Department of Pharmacy Practice and Sciences
at SSPPS demonstrate SSPPS as a leader in innovative pharmacy practice models, cutting-edge pharmacy training, and spearheading optimization of medication use and therapeutics.
PROPOSAL FOR THE DEPARTMENT OF PHARMACEUTICAL SCIENCES

A. Summary
  A.1. Justification

As noted above, establishing two departments will allow for improved faculty governance, better promotion and visibility of the school, enhanced support for fundraising, and substantially improved school representation across a wide variety of internal and external venues where department chairs participate. The proposed Department of Pharmaceutical Sciences will play a critical role in (a) teaching and education, (b) research in pharmaceutical sciences, and (c) service to the University and public communities.

Faculty of the proposed Dept. of Pharmaceutical Sciences are committed to outstanding teaching and education of (1) pharmacy students at SSPPS, (2) medical students, including joint teaching between SSPPS and School of Medicine, and (3) graduate students in doctoral and master’s degree programs in the area of drug discovery and development. In addition, the proposed Dept. of Pharmaceutical Sciences will serve as a hub for translational research and education, bridging campus-wide efforts in the different aspects of drug discovery and development. The Department’s pharmaceutical science expertise and educational activities, through collaborations in teaching and research, will facilitate translational drug discovery research among the campus Schools at UC San Diego, La Jolla Mesa industry-biotechnology and research institutions, the University of California campuses, California, nationwide and internationally.

Overall, faculty of the proposed Dept. of Pharmaceutical Sciences are internationally recognized leaders in pharmaceutical sciences research and education who are addressing the world’s challenges to promote therapeutics innovation for health among diverse peoples.

A.2. History

The faculty and activities of the proposed Dept. of Pharmaceutical Sciences are currently organized as the Division of Pharmaceutical Sciences and the Division of Pharmaceutical Chemistry, which have been in existence since 2016 at SSPPS. At their inception, the two Divisions of Pharmaceutical Chemistry and Pharmaceutical Sciences were chaired respectively by Drs. Bradley Moore (3-year term) and Tracy Handel (6-year term). In 2019, Dr. Dionicio Siegel replaced Dr. Moore as Chair of the Division of Pharmaceutical Chemistry (3-year term). Finally, since July of 2022, Drs. Carlo Ballatore (PharmChem) and Vivian Hook (PharmSci) have been chairing the two Divisions. Historically, the chairs of the two Divisions collaborated closely on faculty issues (e.g., distributing committee assignments). Moreover, the two Divisions maintained regular joint meetings each quarter. The two divisions combined will have 31 faculty, and will be approximately equal in size to the second proposed department. Finally, faculty of these two Divisions participate together in teaching and education in the pharmacy curriculum of SSPPS together with the School of Medicine for joint pharmacy and medical student teaching. Likewise, faculty of the two Divisions participate in graduate education jointly with the graduate programs in Biomedical Sciences, Neurosciences, Bioinformatics, Bioengineering, Computer Science and Engineering, Chemistry and Biochemistry, Biological Sciences, Oceanography and Drug Discovery, Public Health, and related areas at UC San Diego.

Considering that the disciplines of Pharmaceutical Sciences and Pharmaceutical Chemistry are closely aligned, the proposed Dept. of Pharmaceutical Sciences will be a logical step to combine the strengths of the two Divisions under one department. Thus, our committed cadre of Pharmaceutical Sciences faculty are enthusiastic and ready to form the Department of Pharmaceutical Sciences to advance therapeutics innovation education, research, and service.

A.3. Vision and Goals

Vision

The vision of the Department of Pharmaceutical Sciences will be to educate students in the skills, critical thinking, and principles in pharmaceutical sciences that will enable their success as future leaders in therapeutics innovation to promote health.

The Department of Pharmaceutical Sciences will function as a hub for research and education in drug discovery and development by providing both a supportive learning environment and state-of-the-art strategies for the discovery, evaluation, and development of therapeutics, as well as sharing expertise with academic colleagues across campus and beyond.

Goals

Overall Goal:
Education in Advanced, Innovative Pharmaceutical Sciences Research Strategies

The main goal of the Department of Pharmaceutical Sciences will be to provide high quality education for students in drug discovery and development strategies that could be used to address unmet medical needs.

Training of pharmacy students in pharmaceutical sciences is achieved through our established curriculum for the Doctor of Pharmacy degree of SSPPS in didactic courses and in research projects. Training provides pharmacy students with understanding of the principles and strategic concepts of pharmaceutical sciences and pharmacology.

Training of graduate students in drug discovery and development research is an area of great emphasis for the award of the PhD doctoral degree, joint PharmD/PhD degree, and Master’s degree. Graduate student training by faculty of the proposed Dept. of Pharmaceutical Sciences is currently achieved in joint campus efforts with the graduate programs in Biomedical Sciences, Chemistry/Biochemistry, Marine Natural Product Sciences, Bioinformatics, Computer Sciences and Engineering, Bioengineering, Biological Sciences, Neurosciences, Medicine, and related programs. As a Department, faculty will explore ways to forge new educational programs in the discipline of Pharmaceutical Sciences at SSPPS.

Student training is supported by our rich environment that fosters interdisciplinary learning, well-being, diversity, ethics, respect, and community.

Specific Goals
The Department of Pharmaceutical Sciences follows the current strategic plan goals of the Divisions of Pharmaceutical Sciences and Pharmaceutical Chemistry of SSPPS.

Goal 1. Establish innovative pharmaceutical strategies for the pipeline of drug discovery and development.
Innovative research strategies for the drug discovery and development pipeline are being developed by faculty of the proposed Dept. of Pharmaceutical Sciences. The different stages of the drug development pipeline include: (a) drug target identification, e.g., through multi-omics systems biology and validation of mechanistic drug targets, (b) screening and analysis of natural products and synthetic chemical entities to identify hits with confirmed biological activity, (c) computational structure-based drug design and in silico screening, (d) synthetic organic and medicinal chemistry to drive “hit-to-lead” optimization efforts, (e) evaluation of pharmacokinetic, pharmacodynamics, metabolism, and safety, and (f) regulatory requirements for IND for clinical trials. These steps of drug development are applied for small molecule therapeutics as well as biologics. Innovative, new approaches for each of these stages of the drug development pipeline are developed and established by the Department’s faculty.

Goal 2. Implement cutting-edge analytical technologies in pharmaceutical sciences research.
Advanced analytical technologies have become increasingly powerful tools in drug discovery and development research strategies. Our faculty experts are continuously developing innovative approaches in the following specific areas: (a) advanced mass spectrometry technologies in proteomics, peptidomics, metabolomics for chemical structure elucidation of mechanistic biomarkers and drug targets in human diseases, and for drug ADME properties (adsorption, distribution, metabolism, excretion), (b) development of curated collections of natural products and synthetic chemical libraries for drug screening in the discovery process, (c) NMR spectroscopy elucidation of chemical drug structures, (d) computer-aided drug design, and (e) new emerging strategies in drug development. Engagement of these powerful technologies with translational programs across the campus will facilitate bench to bedside therapeutics discovery.

Goal 3. Utilize pharmaceutical data resources for drug discovery to clinical therapeutics, and in the reverse direction from clinical data to drug discovery and development.
Drug discovery and development utilizes numerous drug database resources at multiple levels from chemical structures to drug systems pharmacology in pre-clinical models and in human disease conditions of patients combined with clinical drug informatics. Optimization of drug development requires integration of multi-faceted database platforms combined with design of new database systems. Integration of such diverse database platforms will require building of UC San Diego and community initiatives for (a) discovery of therapeutics achieved through linking drug database platforms with investigators by computational strategies, (b) clinical evaluation of therapeutic outcomes through analysis of electronic health records (EHR) and clinical informatics.

Application of big data analysis by machine learning (ML) and artificial intelligence (AI) will facilitate pharmaceutical sciences research for enhancement of clinical practice. Drug database research is especially important in precision medicine to define drug use for specific sub-populations of patients based on genetic features.

Goal 4. Train the next generation of critical thinkers and innovators in pharmaceutical sciences.
One of the main priorities of the proposed Department of Pharmaceutical Sciences will be to train and educate pharmacy and graduate students in different strategies related to drug discovery and development. Pharmacy students are exposed to pharmaceutical sciences drug strategies through the required research coursework and projects of the pharmacy curriculum, and through the didactic course topics taught by faculty of this Department. Graduate students will gain in-depth research training in innovative pharmaceutical sciences strategies through mentoring by pharmaceutical sciences faculty. Graduate students complete the doctoral degree in the area of ‘Pharmaceutical Sciences and Drug Development’ through the umbrella Biomedical Sciences program. Joint degree PharmD/PhD students are trained in both pharmaceutical sciences and clinical pharmacy, with emphasis on translational drug development. The Department will also participate in training Master’s degree students in Drug Development and Product Management.

Undergraduate students can also receive training by the Department through independent research study programs, research internships, and laboratory assistant efforts. High school students are also selected for research training experiences through the SSPPS program for under-privileged students, allowing students to gain experience in pharmaceutical sciences.

**Goal 5. Serve as a hub of drug discovery excellence to advance therapeutics innovation to the clinic.**

The proposed Department of Pharmaceutical Sciences expertise will play a critical role in promoting translational research efforts. The Department faculty will provide a ‘hub’ for translational research aimed at many of the unmet clinical therapeutic needs. Working collaboratively with the Department of Pharmacy Practice and Sciences, the Department of Pharmaceutical Sciences will bridge campus-wide efforts in basic sciences for translation into clinical therapeutics. Collaboration of the Department at SSPPS with Health Sciences and campus Schools can move UC San Diego to the forefront of therapeutics innovation.

**B. Outline of the Proposed Department of Pharmaceutical Sciences**

**B.1. Research Areas and Grants.**

**Research Areas: Pharmaceutical Sciences Drug Discovery and Development Pipeline**

Faculty of the proposed Department are actively pursuing strategies for the discovery and development of novel therapeutic agents to ameliorate human disease conditions. The Department already covers several aspects of the drug discovery and development pipeline (illustrated in Figure 7 below) from target identification to screening of compound collections and lead optimization, to drug pharmacokinetics, efficacy and pharmacology, safety, dosing, delivery, and FDA regulatory affairs. Faculty of the proposed Department of Pharmaceutical Sciences are currently investigating several human disease therapeutic areas, including cancer, cardiovascular diseases, COVID-19, drug addiction, endocrine disorders, HIV, infectious disease, mental health, microbiome in human diseases, neurological diseases, parasitic diseases, pediatric diseases, pulmonary disorders, and others. In this context, faculty of the proposed Department have collectively maintained a robust level of extramural funding and productivity output (for detailed info see Appendices II and III).

**Figure 7. Pharmaceutical Sciences: Outline of Drug Discovery and Development Pipeline**

The research in pharmaceutical sciences encompasses multidisciplinary efforts spanning from the initial discovery stage, to the development of candidate therapeutic agents for evaluation in clinical trials.
Centers and Organized Translational Programs

Center for Compound Resources. The UC San Diego Center for Compound Resources (UCCR) provides novel chemical libraries for drug screening by UC San Diego researchers. UC San Diego has long-held interest in marine and terrestrial natural products chemistry. Natural product collections are available to trainees and investigators for screening projects.

Drug Screening Core. The UC San Diego Screening Core enables robotic operation of drug screening assays in high throughput fashion, using cell-based or biochemical screens, to advance the discovery of hits and candidate therapeutics. The screening core utilizes state-of-the-art robotic equipment for high throughput screening (HTS) and includes an Acoustic Transfer System, and automated readout instruments, such as the ImageXpress MicroXL for high content phenotypic assays and Envision for luminescence/fluorescence readouts.

Drug Development Pipeline. The UC San Diego Drug Development Pipeline program provides expertise and facilities to evaluate candidate drug ADME (adsorption, distribution, metabolism, and excretion), pharmacokinetics, and metabolites. This program provides bioanalytical equipment and protocols to support drug analyses in biological fluids and tissues in clinical pharmacokinetic studies, and includes the FDA Reference Laboratory for INDs/NDAs for FDA quality drug analyses.

Center for Computational Mass Spectrometry (CCMS). Mass spectrometry is essential for proteomics analysis of complex human disease systems for elucidation of candidate drug targets. The CCMS provides computational tools for analyzing mass spectrometry data provided as a public resource and repository of data. Novel mass spectrometry algorithms for discovery and characterization of unique biomarker proteins, post-translational modifications, protein-protein interactions, proteogenomics, and related are developed to gain biological information from mass spectral data.

Center for Drug Discovery Innovation (cDDI). The cDDI provides resources to facilitate translational research. These resources consist of the CDD Vault data management system for HTS of compound collections for drug discovery, the molecular operating environment (MOE) system for analyzing drug interactions with target protein structures, HTS robotic drug screening technology, compound collections for drug screening, in silico drug screening, in vivo pharmacokinetics and ADME, GLP facility, and FDA reference laboratory for INDs/NDAs of drugs. The cDDI links the UC San Diego campus with the UC Drug Discovery Consortium network of resources for drug discovery and development across eight campuses of the University of California to facilitate progress in therapeutics innovation.

Collaborative Mass Spectrometry Innovation Center. The Collaborative Mass Spectrometry Innovation Center analyzes metabolomics of small molecules for therapeutics discovery and diagnostics by high throughput mass spectrometry technology at the SSPPS. Chemical structure elucidation through analytical mass spectrometry and bioinformatics are defining the structural relationships of natural products and metabolites through spectral networking bioinformatics, together with the Center for Computational Mass Spectrometry at UC San Diego.

Collaborative Center for Multiplexing Proteomics (CCMP). The CCMP conducts quantitative proteomics research for biomarker and drug target discovery in human disease and therapeutics. The CCMP uses quantitative TMT-labeling technologies in unbiased proteomics technologies, which provides the quantification, reproducibility, and significance of data. These efforts promote insight into biomarkers, drug targets, and therapeutics discovery and development.

Center for Drug Discovery and Innovation in Parasitic Diseases (CDIPD). The CDIPD conducts groundbreaking drug discovery research and development for the neglected (tropical) diseases associated with poverty and for which the pharmaceutical industry has traditionally lacked a financial incentive. The Center’s faculty and staff are committed to education and outreach, including through the school’s curriculum and in collaboration with the school’s Admissions committee. Internationally, the CDIPD is highly regarded for its capacity-building engagements with educational institutions in Africa, Europe, Australia, South America and South East Asia. These include hosting undergraduate, graduate, post-doctoral and faculty scientists, who are supported by national and international fellowships.
Collaborative to Halt Antibiotic Resistant Microbes (CHARM). Our proposed Department participates in the CHARM program to forge innovative breakthrough solutions for antimicrobial therapeutics. The premise of the effort is to address infections resulting from pathogen virulence but also from shortfall of the host immune system’s ability to limit pathogen spreading. Talents of diverse scientists seek to unravel the complexity of host-pathogen interactions to reveal new tools to treat infections involving diagnosis and prevention.

Center for Marine Biotechnology and Biomedicine (CMBB). The CMBB supports faculty research teams across UC San Diego, including SSPPS investigators. The Center focuses on research at the intersection of ocean sciences and human health, emphasizing marine drug discovery and development, the ocean microbiome, molecular epidemiology, marine cell biology and development, and the physiology of marine mammals.

Malaria Drug Accelerator (MalDA). MalDA is a consortium of 18 institutions including academic centers of excellence such as Harvard University, MIT, Columbia University, University of Dundee, and pharmaceutical companies (GSK, Novartis, TropIQ) funded by the Bill and Melinda Gates Foundation. The consortium has worked to discover key malaria parasite vulnerabilities and new starting points for antimalarial drug discovery, with substantial contributions to our understanding of how antimalarial drug resistance is established, identified a variety of new malaria multidrug resistance genes and identified the characteristics of drug-like molecules that are more likely to succeed in human trials.


Grants
The faculty of the Department are well-funded with their successes in obtaining research grant awards from the National Institutes of Health (NIH), National Science Foundation (NSF), the Department of Defense, collaborating academic institutions across the US, private foundations, and industry. Grant funding awarded to Pharmaceutical Sciences faculty currently totals more than $29 million in direct and indirect costs (Appendix II). These grants support research, training of graduate and pharmacy students, and service communities with our therapeutic research achievements through public dissemination of published articles, conferences, public data resources, web resources of scientific findings, and related. The Department faculty are continuing their excellent grant support portfolio to engage in outstanding therapeutic translational research.

B.2. Educational Plans
The faculty of the proposed Department of Pharmaceutical Sciences participate broadly in the educational mission of SSPPS and UC San Diego through teaching health sciences pharmacy and medical students, graduate students, undergraduate students, postdoctoral fellows, trainees from international institutions, and visiting scientists from around the world. Faculty will continue teaching and providing research training in these degree programs of the proposed Department of Pharmaceutical Sciences. Faculty are constantly adjusting curricula so that the educational programs represent current advancements in the field. Furthermore, the proposed Department faculty will be planning SSPPS educational programs that will be defined upon completion of the next Strategic Plan phase. Faculty teaching in the educational programs of SSPPS and joint programs with collaborating Schools and Departments at UC San Diego are summarized below.

SSPPS Doctor of Pharmacy (PharmD)
Courses in the Pharmacy Curriculum. The faculty of the Department of Pharmaceutical Sciences teach in both required and elective courses of the pharmacy curriculum required for the PharmD degree. These courses provide understanding of drug actions combined with pharmaceutical properties that form the basis for therapeutic efficacy. Courses for the pharmacy curriculum taught by faculty of the proposed Department of Pharmaceutical Sciences are listed here:

- SPPS 202A Concepts in Pharmacy Practice
- SPPS 205 Pharmacy Informatics
- SPPS 206 Study Design and Biostatistics
- SPPS 210 Student Research
- SPPS 211B Co-Curricular Program II
Research project requirement and optional Summer Research Program of the pharmacy curriculum. Research projects are required of pharmacy students (SPPS 210). The faculty of the proposed Department of Pharmaceutical Sciences provide ample mentoring of pharmacy student research projects, both required projects and optional in-depth Summer Research Program projects that typically result in student contributions to published articles as coauthors. The students present their research projects at Health Sciences and SSPPS poster program sessions, achieved with mentoring by our faculty.

Faculty advisors of pharmacy students. Department faculty routinely serve as advisors to pharmacy students for guidance in understanding their strengths, through the StrengthsFinder program, that benefit their pharmacy training at SSPPS. Individual advising of students by faculty occurs to provide solutions to student challenges such as illness, disabilities, personal family situations, coordination of course requirements with the curriculum requirements, career advising that include CV and interview skills, advice on post-graduate professional opportunities, and advice on any topic requested by students.

Pharmacy curriculum review and updates. Faculty participate in course and program reviews to implement changes that keep the course contents up-to-date. Review of course content and student performances provide the basis for planning and implementing cutting-edge pharmaceutical sciences features of therapeutics for optimal patient care.

UC San Diego School of Medicine, Doctor of Medicine (MD)
Courses in the Medicine Curriculum.
Faculty of the proposed Department of Pharmaceutical Sciences contribute to the teaching for the following School of Medicine courses:

SOMC 220 Foundations of Human Biology (joint course with medical and pharmacy students)
SOMC 221 Cardiovascular System I (joint course with medical and pharmacy students)
SOMC 225 Renal System I (joint course with medical and pharmacy students)
SOMC 224 Clinical Foundations, 1 PBL
SOMC 236 Clinical Foundations, 2 PBL
SOMC 239 Renal System II
SOMC Equity in System Science
SOMT SOM Pharmacology Thread

PhD training in Pharmaceutical Sciences at SSPPS
PhD training in Pharmaceutical Sciences within the Biomedical Sciences graduate program. The faculty of the Department participate in PhD training in the area of Pharmaceutical Sciences. This graduate training is conducted with the umbrella Biomedical Sciences (BMS) graduate program at UC San Diego. The BMS program covers multiple disciplines
in medical science research and Pharmaceutical Sciences training is formatted with the BMS area of “Molecular Pharmacology and Drug Discovery.” Our faculty serve as thesis advisors, committee members, and teach in the required core courses of the BMS program and in graduate courses in the training area of Pharmaceutical Sciences. Graduate courses taught by the faculty of the proposed Department of Pharmaceutical sciences consist of BMS and SSPPS graduate courses, listed here:

**Core Courses in Pharmaceutical Sciences:**
- SPPH 263A  Principles of Pharmaceutical Sciences and Drug Development: Preclinical Drug Discovery to IND.

**Courses in Selected Areas of Pharmaceutical Sciences and Drug Development**
- SPPS 226  Pharmacokinetics/Pharmacodynamics
- SPPS 219  Pharmacogenomics
- SPPS 222  Pharmaceutical and Physical Chemistry
- SPPS 223  Pharmaceutical Biochemistry
- SPPS 224  Biopharmaceutics
- SPPS 225  Dosage Forms and Drug Delivery Systems
- SPPS 268  Systems Mass Spectrometry
- SPPS 281  Medicinal Aspects of Natural Products

**BMS Graduate Courses**
- BIOM 200  Molecules to Organisms (required)
- BIOM 219  Scientific Research Ethics (required)
- BIOM 234  Careers
- BIOM 253  Pathogens and Host Defense
- BIOM 254  Molecular and Cell Biology
- PHAR 255  Molecular Basis of Drug Action and Disease Therapy

Support for graduate students in the Pharmaceutical Sciences training area of the BMS program. Numerous NIH T32 training grants support graduate students studying in the area of Pharmaceutical Sciences. A primary training grant supporting PhD students focusing on Pharmaceutical Sciences is the T32 of “Cellular and Molecular Pharmacology,” co-directed by one of our Pharmaceutical Sciences faculty. Support for graduate students comes largely from faculty-awarded grants, which can cover student tuition/fees/stipend and research expenses. Many graduate students are successful in obtaining independent predoctoral fellowships from the NIH and other governmental and private agencies. Faculty of the proposed Department of Pharmaceutical Sciences will continue these successful plans for graduate student support.

**SSPPS PharmD/PhD Training in Pharmaceutical Sciences and Drug Development**

The joint PharmD/PhD degree provides students with training in clinical therapeutics combined with pharmaceutical sciences to enable their translational research to address unmet therapeutic challenges. Students who complete this program are uniquely suited to conduct basic pharmaceutical and clinical pharmacy research to translate bench to bedside therapeutics development.

Students of this joint degree program first complete two years of the pharmacy curriculum combined with three research rotations. Students then enroll in BMS for 3-4 years of training to complete the PhD degree. Students then proceed to training of years 3 and 4 of the pharmacy curriculum to complete the PharmD degree. The total training time for the PharmD/PhD degree typically consists of 7-8 years.

**SSPPS Master of Science in Drug Development and Product Management**

The Master of Science in Drug Development and Product Management provides education on building the clinical, managerial, regulatory and marketing skills and insight to equip graduates to become effective leaders in drug development from pre-clinical to patient. This degree program has a 3-quarter curriculum consisting of 10 courses covering the topics of pharmacotherapy and diseases, pharmaceutics for small molecules and macromolecules, regulatory strategy, clinical trial development, health outcomes, marketing, biologics, entrepreneurship, and business development. The proposed Department of Pharmaceutical Sciences provides advice, input and teaching for this Master’s program.
PhD Programs across the UC San Diego Campus

Faculty of our proposed Department participate generously in numerous graduate programs across campus, reflecting the interdisciplinary nature of Pharmaceutical Sciences in translational research to advance mechanistic drug agents to the clinic. Our faculty are active in these graduate programs in teaching courses, serving as thesis research advisors, participating on thesis committees, enriching research training through collaborations, advising students on career opportunities, and fulfilling our obligation to the training of students with diverse backgrounds. Faculty of our Department participate in graduate programs across campus, consisting of:

- Biomedical Sciences Graduate Program
- Bioinformatics Graduate Program
- Biological Sciences Graduate Program
- Bioengineering Graduate Program
- Chemistry/Biochemistry Graduate Program
- Computer Science and Engineering Programs
- Neurosciences Graduate Program
- Marine Chemical and Biology Graduate Programs (Scripps Institution of Oceanography)

Many Department faculty hold joint appointments with other Departments including Chemistry/Biochemistry, Neurosciences, Pediatrics, Pharmacology, Computer Sciences and Engineering, and the Scripps Institution of Oceanography. Thus, our faculty teach in courses of these programs as shown below:

- BIOM 200 Molecules to Organisms
- BIOM 219 Scientific Research Ethics
- BIOM 234 Careers
- BIOM 253 Pathogens and Host Defense
- BIOM 254 Molecular and Cell Biology
- CHEM 113 Biophysical Chemistry to Macromolecules
- CHEM 158 Applied Spectroscopy
- CHEM 185 Introduction to Computational Chemistry
- CHEM 186 Molecular Simulations Lab
- CHEM 209 Macromolecular Recognition
- CHEM 261 Research Conference
- CHEM 283 Seminar in Computer Science and Engineering
- CHEM 299 Graduate Research
- CHEM 408 Organic Chemistry
- CMM 250 Stem Cell Biology
- CSE 190 Topics in Computer Science and Engineering
- MED 238 Molecular Biology of the Cardiovascular System
- PATH 225 Seminars in Molecular Pathology
- PHAR 255 Molecular Basis of Drug Action and Disease Therapy
- SIO 242B Marine Biotechnology, Graduate Seminar
- SIO 262 Graduate Seminar in Marine Chemical Biology
- SIO 264 Biosynthesis of Marine Natural Products
- SIO 265 Marine Chemical Ecology
- SIO 296 Ecology and Medicinal Aspects of Natural Products
- SIO 297 Molecular Biology Seminar

The education of students in programs across the UC San Diego campus is enriched by the expertise of faculty of the proposed Department of Pharmaceutical Sciences.

Undergraduate education

Faculty are participating in the education of undergraduate students in seminars, independent research studies, internships, courses as noted above, academic advising and mentorship, and related. Undergraduate students who gain such teaching and research experience are largely from the disciplines of Chemistry/Biochemistry, Computer Science and Engineering, Bioengineering, and related fields.
Faculty participate in the UC San Diego Summer Training Academy for Research Success (STARS) program which provides undergraduate students with research mentoring combined with an advisory program on how to prepare for applications to graduate school educational programs. The STARS program enhances the quality of graduate student applicants, and strives to advise students from diverse and underprivileged backgrounds.

B.3. Justice, Equity, Diversity, and Inclusion

Faculty of the proposed Department of Pharmaceutical Sciences, and all faculty of SSPPS, are fully committed to the principles of justice, equity, diversity and inclusion and in the section below, we outline specific School-wide initiatives that have involved and will continue to involve faculty, staff and trainees from both proposed Departments. For several years, efforts have been made in the school to enhance EDI material in our PharmD educational curriculum. These teaching and curriculum materials, related to anti-racism, implicit bias, micro-aggressions, inclusive care, health disparities, etc., are now available to everyone in the school through a dedicated school-wide Canvas website for EDI. This allows the faculty at large to view the type of material being covered and its relevance to the school activities and teaching mission, in addition to offering information on the broader historical and societal context of diversity topics. Department faculty also contribute substantially to admissions and pre-pharmacy recruitment and mentoring for our PharmD program. This includes both formal and informal programs (PUMP, STOMPP, HBCU and HSI outreach, etc.) designed to increase the diversity of the PharmD student body, and improve our inclusive and supportive climate at SSPPS.

Our faculty members actively engage in different outreach training programs. For example, faculty of our proposed Department are involved in the Californian Shaman Program (http://calshaman.ucsd.edu). The Shaman Program is designed to encourage diversity and careers in science, and provides high school students with research opportunities. Through a combination of hands-on laboratory experience and fieldwork, pre-college students engage in research projects that foster science self-efficacy and self-identification as scientists and provide the motivation and skills that enable students to have a career in STEM disciplines. The Californian Shaman program provides opportunities to precollege students in diverse scientific disciplines including analytical chemistry for understanding drug actions. Students participate in research design and conduct experiments that address scientific hypotheses. Students investigate compounds derived from plant samples archived at the UC San Diego Center for Compound Resources (UCCR) in drug screening projects. Students’ experimental findings collaborate with ongoing research of our Department and UC San Diego to provide enriching research experiences.

Faculty of the proposed Department of Pharmaceutical Sciences have the opportunity to participate in training activities of the Center of Excellence Research Methodology Training Laboratory (COE-RMTL). COE-RMTL trains students from disadvantaged backgrounds to conduct biochemical research to prepare them to enter graduate programs in the health sciences and/or pursue careers in healthcare that can address health disparities. The COE-RMTL offers comprehensive research laboratory training for middle and high school, community college and undergraduate students. The program consists of 40 hours of basic science methodology training. For over twenty years, the COE-RMTL has trained and inspired young, low-income and underrepresented minority students to pursue careers in the biomedical sciences.

Our faculty serve as Faculty Advocates for the PATHways to STEM (PATHS) through Enhanced Access and Mentorship Program. This is a scholarship and student support program at UC San Diego that supports underrepresented scholars on their pursuit of STEM degrees. As a commitment to this program, our faculty are mentoring PATHS Scholars for research internship in the SSPPS labs. In addition, they serve as members of the PATHS Application Review Committee to support with reviewing and scoring PATHS Scholars applications and interviewing the final candidates for the incoming cohort.

Our faculty also have the opportunity to serve as research advisors in the STARS Program (described above) and to Mater Dei high school students from a low-income region of San Diego. This program provides summer research experiences for these students with our faculty. Faculty also participate in the ENLACE program, which is a bi-national summer research program at UC San Diego that aims to encourage the participation of high school students, college students, and researchers/teachers, in research in the sciences and engineering, while promoting cross-border friendships in the Baja California/San Diego region. Students in these summer programs gain understanding of scientific inquiry in the area of therapeutics development.

Mentoring of students in our community is important to foster interest in therapeutics research. Mentoring of high school students is conducted by our faculty in several programs, including: (a) summer research internship program for Mater Dei high school students from a low income area of San Diego, (b) the University City High School Project Lead the Way (PLTW) Honors BioMedical Sciences internship program for real-world laboratory experiences in health sciences or biotechnology, (c) the Shaman program for high school student research experience (see further description in next section), and (d) and the Center of Excellence Research Methodology Training Laboratory (COE-RMTL) for research education of disadvantaged high school students (see further description in next section). Research mentoring of students provides them
with exciting opportunities to learn about drug discovery research to improve health, and provide advice about college and career opportunities.

**B.4. Clinical Plan:**
Drs. Momper and Capparelli (Clinical X and RTAD) have a therapeutic drug monitoring service to provide dosing recommendations based on drug concentrations measured in their laboratory. The rest of the faculty in this proposed department do not have clinical licensure, so the department as a whole will not have a large clinical footprint.

**B.5. Space Allocation**
Space for classroom teaching, conferences, laboratories, core facilities, offices, and administration of the proposed Department will utilize the current space allocated for the combined Divisions of Pharmaceutical Sciences and Pharmaceutical Chemistry. The space is housed in the Pharmaceutical Sciences Building (PSB) of the SSPPS. Faculty space is also present in buildings located near PSB on the UC San Diego campus.

**Faculty Located at Campus Buildings of UC San Diego**
Several SSPPS faculty of this Department hold joint appointments with other Departments and Schools at UC San Diego where such faculty are located with their laboratory and office space. These space locations include the Medical Teaching Facility building (Health Sciences), Biomedical Research Facility II building (Health Sciences), Basic Sciences Building (Health Sciences), Pacific Hall (Chem/Biochem), Tata Hall (Chem/Biochem), Computer Sciences and Engineering building (CSE), Scholander Hall (SIO), and Sverdrup Hall (SIO).

**B.6. Equipment**
The faculty of the Department provide equipment for pharmaceutical sciences research as core facilities and as shared instrumentation in collaborative projects.

**UC San Diego Drug Discovery Pipeline.** The UC San Diego Drug Development Pipeline is a campus-approved recharge facility that provides screening tools for drug metabolism and pharmacokinetics for UC faculty and outside partners. Specific capabilities include metabolic stability (microsomes and hepatocytes), cytochrome P450 (CYP) inhibition, CYP induction, *in vivo* pharmacokinetics, metabolite identification, protein binding, permeability, physicochemical profiling, and bioanalytical chemistry. These tools can identify potential compound liabilities and guide necessary structural modifications or other development strategies to mitigate problems.

**NMR Facility.** The NMR Facility at SSPPS houses a 600 MHz (14.1 Tesla) Bruker Advance III NMR spectrometer configured with a 1.7 mm triple resonance cryoprobe and a 24-position sample changer. The NMR facility is used to monitor and validate reactions, to screen libraries for possible drug leads, to quantify metabolites and identify disease markers, to discover the chemical structure of unknown compounds, and to determine the three-dimensional structures of proteins, their dynamics, and how they interact with other molecules. This NMR instrumentation supports medicinal chemists, natural products researchers, metabolomics experts, structural biologists, and nanotechnologists within the SSPPS and other Schools, including the Scripps Institution of Oceanography, the Department of Chemistry and Biochemistry, School of Medicine, the Salk Institute, the J. Craig Venter Institute, and others. Users of the Facility are trained by the Director. Importantly, students use the NMR functions and are trained to acquire and interpret data.

**High-Throughput Screening (HTS) Core Facility.** The Drug Screening Core Laboratory is a Biosafety Level 2 facility (BSL2) for HTS and cell-based screens. Screening assay results are recorded with an EnVision (Perkin Elmer) microplate fluorescence/luminescence reader or an ImageXpress MicroXLS (Molecular Devices) and analyzed using MetaXpress software. The platform is also equipped with an Acoustic Transfer System (ATS, EDC Biosystems), a central robotic arm (Precise Flex 400) integrating the ATS to the ImageXpress, plate hotel. The facility includes the Biomek FXp liquid handler (Beckman Coulter), a microplate washer dispenser, freezers and desiccators to store libraries of compounds. The UC San Diego Screening Core is also equipped with one IVIS Lumina LT, series III Imaging System (Perkin Elmer) with XGI-8 Anesthesia System (XFOV-24) located in the vivarium, used for non-invasive mouse imaging consisting of one IVIS Lumina LT and series III Imaging System (Perkin Elmer) with XGI-8 Anesthesia System (XFOV-24). Designated ABSL2 laboratories with laminar flow are available for research.

**Equipment in Faculty Laboratories for Research Collaborations**
Faculty are highly collaborative with investigators at SSPPS, across campus, the La Jolla Mesa, California, the nation, and worldwide. Equipment utilized in productive research collaborations are summarized here.

Mass Spectrometers for Metabolomics, Proteomics, Peptidomics, and Targeted Drug Pharmacokinetics. Faculty laboratories together house more than a dozen mass spectrometer systems, with front-end LC, for sophisticated metabolomics, proteomics, peptidomics, and drug measurements with suites of bioinformatics tools for in-depth data analyses.

Protein Expression for Crystallography of Protein Structures. Large-scale protein expression, purification, and protein crystallography equipment are utilized to conduct structural analysis of drug targets.

Cell Culture. Analysis of cellular drug actions utilizes cell culture equipment of sterile hoods, incubators, microscopes, and related instrumentation.

Computational Drug Binding to Targets and In Silico Drug Screening. A variety of computational tools and databases for drug binding to targets enhances structure-based drug design and in silico screening of drug candidates.

B.7. Organization Chart

The proposed Department of Pharmaceutical Sciences will be one of two Departments of SSPPS (the organizational chart was shown above in Figure 2). The Department Chairs work with the SSPPS Dean, together with Associate Deans, to conduct high quality education, research, and service. Administrative support for the two Departments is formatted as SSPPS-wide functions for business and fiscal affairs, grants management and fund managers, human resources, student affairs, admissions, curriculum, faculty support, and related.
C. Faculty Appointments and Commitment

Appointed faculty are fully committed to the excellence of the proposed Department of Pharmaceutical Sciences for high quality education and training, research, and University and public service. Faculty appointments of the proposed Department of Pharmaceutical Sciences are shown in Table 4. Faculty biographies are provided in Appendix I.

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<thead>
<tr>
<th>Name</th>
<th>Series</th>
<th>Rank</th>
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<tbody>
<tr>
<td>Ruben Abagyan, PhD</td>
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<td>Professor</td>
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<tr>
<td>Carlo Ballatore, PhD</td>
<td>Ladder Rank</td>
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<tr>
<td>Nuno Bandeira, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
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<tr>
<td>Conor Caffrey, PhD</td>
<td>Ladder Rank</td>
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<tr>
<td>Edmund Capparelli, PharmD</td>
<td>Clinical X</td>
<td>Professor, RTAD</td>
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<td>Geoffrey Chang, PhD</td>
<td>Ladder Rank</td>
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</tr>
<tr>
<td>Michael Gilson, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>David Gonzalez, PhD</td>
<td>Ladder Rank</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Asa Gustafsson, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>Tracy Handel, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>Vivian Hook, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>Jair Lage de Siquiera Neto, PhD</td>
<td>Adjunct</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Irina Kufareva, PhD</td>
<td>Adjunct</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>James McKerrow, PhD, MD</td>
<td>Graduate Division</td>
<td>Professor</td>
</tr>
<tr>
<td>Tadeusz Molinski, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>Jeremiah Momper, PharmD, PhD</td>
<td>Clinical X</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Bradley Moore, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>Victor Nizet, MD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>Anthony O'Donoghue, PhD</td>
<td>Ladder Rank</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Larissa Podust, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>Zoran Radic, PhD</td>
<td>Adjunct</td>
<td>Associate Professor, RTAD</td>
</tr>
<tr>
<td>Dionicio Siegel, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>Debbie Spector, PhD</td>
<td>Ladder Rank</td>
<td>Professor, RTAD</td>
</tr>
<tr>
<td>Raymond Suhandyatunata, PhD</td>
<td>Adjunct</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Palmer Taylor, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>Dong Wang, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
<tr>
<td>Elizabeth Winzeler, PhD</td>
<td>Ladder Rank</td>
<td>Professor</td>
</tr>
</tbody>
</table>

D. Financial Package

D.1. 5-year projected fiscal plan

D.1.a. Current fiscal status.

The proposed Department of Pharmaceutical Sciences combines the fiscal support of the existing Division of Pharmaceutical Sciences and Division of Pharmaceutical Chemistry for the new Department. These two Divisions are currently financially supported by the School, SSPPS, and by contracts and grants to cover faculty salaries, teaching support, administrative support, and related functions necessary for education, research, and service. Primary revenue sources into the school that will be used to support this Department are tuition and professional fees for the PharmD degree program, grants and contracts, and philanthropy. The Department Chair will be a critical partner with the Dean and the Advancement team to focus philanthropic efforts in areas of highest relevance to the Pharmaceutical Sciences faculty strengths, such as
drug discovery and development, innovation and entrepreneurship and graduate education. Likewise, the Department Chair will work closely with the Associate Dean for Research and Innovation to identify new research and innovation funding avenues for educational and research programs.

The proposed Department, and the current Divisions of Pharmaceutical Sciences and Division of Pharmaceutical Chemistry, hold 18 FTEs that are distributed among the appointed faculty (listed in above in section C). The FTEs provide faculty salary support. Faculty salaries are also supported by extramural research grants and awards.

Administrative support for teaching, research, and service are currently funded by the SSPPS. This Administrative support will cover the two proposed Department of Pharmaceutical Sciences and Department of Pharmacy Practice and Sciences.

In summary, fiscal support of the activities of the proposed Department of Pharmaceutical Sciences is in place at SSPPS. See Tables 5 and 6 below for financial summaries of prior years and projected future years. Values in Table 3 are approximate, showing the estimated revenues and expenditures if these two divisions had been a department. For jointly appointed faculty who receive support from other departments (e.g. 0.5 FTE from SSPPS and 0.5 FTE from partner department, such as SIO, Chemistry, etc.), only the percent effort supported by SSPPS is included in the revenue and expenses of the tables below. Similarly, only the grants that are managed in SSPPS are included in the tables below. Grants managed by other partner units do not appear in Table 5. For a more complete list of grant funding that pharmaceutical sciences faculty bring into the University, please see Appendix II.

### Table 5. Summary of Revenue and Expenditures, 2018 - 2023

<table>
<thead>
<tr>
<th>REVENUE</th>
<th>FY 18/19</th>
<th>FY 19/20</th>
<th>FY 20/21 (New Systems Implemented)</th>
<th>FY 21/22</th>
<th>FY 22/23 Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract and Grants</td>
<td>10,741,351</td>
<td>12,074,463</td>
<td>8,389,068</td>
<td>11,356,277</td>
<td>11,983,188</td>
</tr>
<tr>
<td>Gift/Endowments</td>
<td>380,068</td>
<td>167,103</td>
<td>284,618</td>
<td>215,793</td>
<td>367,454</td>
</tr>
<tr>
<td>Core CBO Allocations</td>
<td>3,468,401</td>
<td>3,638,247</td>
<td>3,625,185</td>
<td>4,144,279</td>
<td>3,684,485</td>
</tr>
<tr>
<td>Self-Supporting</td>
<td>56,700</td>
<td>45,208</td>
<td>20,415</td>
<td>7,402</td>
<td>17,757</td>
</tr>
<tr>
<td>Other Revenues</td>
<td>329,006</td>
<td>176,765</td>
<td>118,967</td>
<td>548,427</td>
<td>306,775</td>
</tr>
<tr>
<td>Service Agreements</td>
<td>219,056</td>
<td>215,545</td>
<td>60,452</td>
<td>410,708</td>
<td>321,702</td>
</tr>
<tr>
<td>Department Assessments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VC/Dean Allocations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL REVENUE</strong></td>
<td>15,194,583</td>
<td>16,317,331</td>
<td>12,498,705</td>
<td>16,682,885</td>
<td>16,681,360</td>
</tr>
</tbody>
</table>

### EXPENSES

#### Salaries & Benefit Expenses

| Academic Salaries             | 2,728,876 | 2,862,508 | 2,838,830                          | 3,207,646 | 2,804,022         |
| Non-Academic Salaries         | 3,284,079 | 3,402,140 | 3,142,947                          | 2,213,236 | 1,966,070         |
| Employee Benefits             | 2,177,952 | 2,265,877 | 2,191,253                          | 1,888,324 | 1,778,957         |
| - Academic CBR                | 739,525   | 775,740   | 786,356                            | 936,633   | 880,463           |
| =Non-Academic CBR             | 1,438,426 | 1,490,137 | 1,404,897                          | 951,691   | 898,494           |
| **TOTAL SALARIES & BENEFITS** | 10,368,858 | 10,796,401 | 10,364,282                         | 9,197,530 | 8,328,005         |

#### Non-Payroll Expenses

| Supplies & Materials          | 2,769,657 | 2,624,902 | 2,085,661                          | 2,744,553 | 2,066,699         |
| Other Expenses                |           |           |                                    |           |                   |
| Shared Services               | 195,765   | 178,976   | 161,156                            | 164,928   | 136,851           |
| Interest Expense              |           |           |                                    |           |                   |
| **TOTAL NON-PAYROLL EXPENSES**| 6,061,366 | 6,446,373 | 6,013,591                          | 7,096,829 | 6,050,068         |
| **TOTAL EXPENSES**            | 16,430,225 | 17,242,774 | 16,377,873                         | 16,294,359 | 14,378,073        |

| NET SURPLUS/DEFICIT           | (1,235,642) | (925,442) | (3,879,168) | 388,527 | 2,303,287         |
| Other Transfers               | 1,640,433  | 940,852   |            |         |                   |
| VC/Dean Transfers             |           |           |            |         |                   |
| **TOTAL OTHER TRANSFERS**     | 1,640,433  | 940,852   |            |         |                   |

| NET AFTER TRANSFERS           | 404,791   | 15,410    | (3,879,168) | 388,527 | 2,303,287         |
Table 6. Projections of Revenue and Expenditures, 2024 - 2028

<table>
<thead>
<tr>
<th></th>
<th>FY 23/24</th>
<th>FY 24/25</th>
<th>FY 25/26</th>
<th>FY 26/27</th>
<th>FY 27/28</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract and Grants</td>
<td>12,222,852</td>
<td>12,467,309</td>
<td>12,716,655</td>
<td>12,970,988</td>
<td>13,230,408</td>
</tr>
<tr>
<td>Gift/Endowments</td>
<td>374,803</td>
<td>382,299</td>
<td>389,945</td>
<td>397,743</td>
<td>405,698</td>
</tr>
<tr>
<td>Core CBO Allocations</td>
<td>3,829,677</td>
<td>4,004,063</td>
<td>4,185,466</td>
<td>4,374,149</td>
<td>4,570,386</td>
</tr>
<tr>
<td>Self-Supporting</td>
<td>18,112</td>
<td>18,474</td>
<td>18,844</td>
<td>19,221</td>
<td>19,605</td>
</tr>
<tr>
<td>Other Revenues</td>
<td>312,911</td>
<td>319,169</td>
<td>325,552</td>
<td>332,063</td>
<td>338,704</td>
</tr>
<tr>
<td>Service Agreements</td>
<td>328,136</td>
<td>334,699</td>
<td>341,393</td>
<td>348,221</td>
<td>355,185</td>
</tr>
<tr>
<td>Department Assessments</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VC/Dean Allocations</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td><strong>TOTAL REVENUE</strong></td>
<td>17,136,490</td>
<td>17,576,012</td>
<td>18,027,854</td>
<td>18,492,384</td>
<td>18,969,986</td>
</tr>
</tbody>
</table>

|                |          |          |          |          |          |
| **EXPENSES**    |          |          |          |          |          |

\*Salaries & Benefit Expenses*

<table>
<thead>
<tr>
<th></th>
<th>FY 23/24</th>
<th>FY 24/25</th>
<th>FY 25/26</th>
<th>FY 26/27</th>
<th>FY 27/28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Salaries</td>
<td>2,888,143</td>
<td>2,974,787</td>
<td>3,064,030</td>
<td>3,155,951</td>
<td>3,250,630</td>
</tr>
<tr>
<td>Non-Academic Salaries</td>
<td>2,025,052</td>
<td>2,085,803</td>
<td>2,148,377</td>
<td>2,212,829</td>
<td>2,279,214</td>
</tr>
<tr>
<td>Employee Benefits</td>
<td>1,899,384</td>
<td>2,057,577</td>
<td>2,223,553</td>
<td>2,397,635</td>
<td>2,580,161</td>
</tr>
<tr>
<td><strong>TOTAL SALARIES &amp; BENEFITS</strong></td>
<td>8,711,962</td>
<td>9,175,745</td>
<td>9,659,513</td>
<td>10,164,050</td>
<td>10,690,165</td>
</tr>
</tbody>
</table>

\*Non-Payroll Expenses*

<table>
<thead>
<tr>
<th></th>
<th>FY 23/24</th>
<th>FY 24/25</th>
<th>FY 25/26</th>
<th>FY 26/27</th>
<th>FY 27/28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplies &amp; Materials</td>
<td>2,108,033</td>
<td>2,150,194</td>
<td>2,193,198</td>
<td>2,237,061</td>
<td>2,281,803</td>
</tr>
<tr>
<td>Other Expenses</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shared Services</td>
<td>139,588</td>
<td>142,380</td>
<td>145,228</td>
<td>148,132</td>
<td>151,095</td>
</tr>
<tr>
<td>Overhead - IDC</td>
<td>3,923,448</td>
<td>4,001,917</td>
<td>4,081,956</td>
<td>4,163,595</td>
<td>4,246,867</td>
</tr>
<tr>
<td>Interest Expense</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL NON-PAYROLL EXPENSES</strong></td>
<td>6,171,070</td>
<td>6,294,491</td>
<td>6,420,381</td>
<td>6,548,789</td>
<td>6,679,764</td>
</tr>
</tbody>
</table>

|                |          |          |          |          |          |
| **TOTAL EXPENSES** | 14,883,032 | 15,470,236 | 16,079,894 | 16,712,838 | 17,369,929 |

<table>
<thead>
<tr>
<th></th>
<th>FY 23/24</th>
<th>FY 24/25</th>
<th>FY 25/26</th>
<th>FY 26/27</th>
<th>FY 27/28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Surplus/Deficit</td>
<td>2,253,458</td>
<td>2,105,776</td>
<td>1,947,959</td>
<td>1,779,546</td>
<td>1,600,057</td>
</tr>
<tr>
<td>Other Transfers</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VC/Dean Transfers</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL OTHER TRANSFERS</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>FY 23/24</th>
<th>FY 24/25</th>
<th>FY 25/26</th>
<th>FY 26/27</th>
<th>FY 27/28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net After Transfers</td>
<td>2,253,458</td>
<td>2,105,776</td>
<td>1,947,959</td>
<td>1,779,546</td>
<td>1,600,057</td>
</tr>
</tbody>
</table>

D.1.b. FTE allocation.

The proposed Department of Pharmaceutical Sciences currently holds 18 FTEs. These 18 FTEs are distributed among the faculty listed in section C for faculty appointments of the Divisions of Pharmaceutical Sciences and Pharmaceutical Chemistry.

D.1.c. Non-academic staff.

Non-academic staff provide support for teaching and education, research, and service for the proposed Department. These staff are already present at the School, SSPPS, and are experienced in high quality support of SSPPS academic activities. Our staff provide support for student affairs, admissions and curriculum, grants management and fund managers, support of faculty teaching, human resources, and related. These staff will support activities of the new Department.

E. Transition Plans for the Proposed Department of Pharmaceutical Sciences

Transition to the proposed Department of Pharmaceutical Sciences, from the Divisions of Pharmaceutical Sciences and Pharmaceutical Chemistry, is expected to occur smoothly since the activities of the Department are currently in place by these Divisions. These areas are provided below with reference to the earlier sections of this proposal that describe the indicated activities of the proposed Department.
Transition will involve selection of the Chair of the Department of Pharmaceutical Sciences and a Director of Equity, Diversity, and Inclusion. These two positions will be implemented upon approval of the proposed new Department. The areas of Education, Resources, Research and Laboratory Facilities, Industry Relationships, and Contributions to the University, State, and others during transition to the new Department will continue to operate in a current, ongoing manner as they are now conducted by the Divisions of Pharmaceutical Sciences and Pharmaceutical Chemistry. Therefore, the transition to the new Department should occur smoothly.

E.1. Education
The Department will conduct educational activities as described in section B.2 for Educational Plan. Faculty will continue high caliber training of pharmacy students jointly with medical students, graduate students for PhD and Master’s degrees, postdoctoral fellows, undergraduate and high school students, as well as visiting scientists. Inclusion and equity in educational endeavors will train students of diverse backgrounds and experiences. Training of our graduates will bring equity, diversity, and inclusion to their professional fields.

E.2. Resources
The new Department will be provided with resources that currently support teaching, research, and service activities of the Divisions of Pharmaceutical Sciences and Pharmaceutical Chemistry, as described in section D.1.a for current fiscal status.

Notably, the School (SSPPS) will provide the Department with a start-up/seed fund of $50,000 per year, for 5 years, as a resource for Departmental activities. This Departmental resource will be managed by the Chair for the benefit of faculty and students.

E.3. Research and Laboratory Facilities
During transition, the new Department’s research and laboratory facilities will continue as they are currently formatted for faculty of the two Divisions of Pharmaceutical Sciences and Pharmaceutical Chemistry, as described in section B.1.5. for space allocation. The laboratory space is extensively utilized for required research projects of pharmacy students, graduate students, postdoctoral fellows, undergraduate and high school students, and visiting scientists. Use of research laboratory space is reviewed by the SSPPS Space Committee on a routine basis to provide appropriate allocation of space required for ongoing research programs.

E.4. Industry Relationships
The new Department will continue ongoing industry relationships in teaching, research, and service to the University. Our local industry experts in San Diego currently participate in teaching lectures in several of our pharmacy courses and graduate courses on topics of drug discovery and development. Industry companies also sponsor fellowships and internships for our trainees.

E.5. Contributions of the Proposed Department of Pharmaceutical Sciences to the University, State, National, and International Programs Illustrate SSPPS as a Hub for Translational Therapeutics Innovation
The faculty of the new Department are actively engaged in contributing to teaching, research, and service in extensive collaborations with colleagues throughout the UC San Diego campus, San Diego research institutions and industry, California statewide translational programs (academic, industry, and state), national translational programs (academic, industry, government, private foundations), and international training programs in therapeutics innovation world-wide. These broad interactions of the proposed Department of Pharmaceutical Sciences at SSPPS demonstrate SSPPS as a ‘hub’ of translational drug discovery and development for novel therapeutics for clinical pharmacy (illustrated below in Figure 8).
Figure 8. Dept. of Pharmaceutical Sciences: SSPPS Hub for Therapeutics Innovation

The SSPPS Dept. of Pharmaceutical Sciences and the Dept. of Pharmacy Practice and Sciences provide a Hub of translational expertise to advance novel therapeutic agents from the bench to the bedside.

SSPPS Hub of Translational Sciences for Therapeutics Innovation

Department Contributions to UC San Diego

At UC San Diego, the new Department will contribute extensively to numerous teaching efforts of other Departments and Schools, as described in section B.2 for Educational Plans, which covers:

a. Education for the PharmD degree and joint teaching with medical students
b. PhD graduate degree training in Pharmaceutical Sciences with the Biomedical Sciences graduate program
c. PhD graduate degree training with other departments and programs, including Chemistry and Biochemistry and Bioinformatics and Systems Biology
d. PharmD/PhD degree training in Pharmaceutical Sciences and Drug Development of SSPPS, SOM, and campus Departments and Schools
e. Master’s program in Drug Development and Product Management.
f. PhD graduate programs across the UC San Diego campus.
g. Undergraduate education across the UC San Diego campus
h. Community high school student education.

At UC San Diego, faculty of the new Department are already involved in extensive research collaborations with colleagues across campus which includes the Scripps Institution of Oceanography, School of Medicine, Chemistry/Biochemistry, Biological Sciences, School of Engineering in Computer Sciences and Engineering, Bioengineering and others. These collaborations utilize the Drug Development Pipeline expertise of the proposed Department of Pharmaceutical Sciences, which consists of:

a. Translational Research Areas in Pharmaceutical Sciences
   i. Pharmaceutical Sciences Drug Discovery and Development Pipeline
   ii. Centers and Organized Translational Programs
   iii. Innovation in Human Disease Therapeutics with Collaborations
b. Grants in Collaborative Efforts

Contributions to La Jolla and San Diego, State of California, National, and International

La Jolla and San Diego. Faculty of the new Department collaborate extensively in research contributions to institutions in La Jolla, which include the Salk Institute, the Scripps Research Institute, the Burnham Institute, as well as to industry in the San Diego area. Our Departmental faculty contribute to providing industry and biotechnology partners with opportunities to engage with students in teaching, research internships and fellowships, and mentorship.
State of California. Faculty of our Department contribute to teaching and research collaborations of the UC BRAID (Biomedical Research Acceleration, Innovation, and Development) program of the 5 medical school campuses of the University of California for translational drug research. Our Faculty contribute pharmaceutical sciences research expertise in collaborative research with (a) Universities throughout the state that include the University of California campuses, University of Southern California, Stanford University, and others, (b) numerous industry and biotechnology companies, and state programs such as the California Institute for Regenerative Medicine (CIRM) and the California Department of Consumer Affairs for cannabis research.

National Contributions. Our faculty contribute broadly to national translational programs with academic institutions, industry and biotechnology, government agencies, and related organizations. In translational research, our faculty collaborate extensively across the nation with investigators at (a) academic Universities and research institutions, (b) industry and biotechnology partners, (c) government agencies including the National Institutes of Health, National Science Foundation, Dept. of Defense, and others. In teaching, our faculty contribute extensively to educational programs across the nation by (a) seminar lectures, (b) training of students in research collaborations, (c) serving as advisors to industry and biotechnology partners, and (d) scientific input to collaborations with government agencies including the National Institutes of Health. In service, our faculty contribute broadly to the scientific community through (a) review of grant proposals of the NIH, NSF, private foundations, and related, (b) review and mentoring of graduate students, postdocs, and junior faculty research, (c) review of manuscripts for journal peer-reviewed publications, and (d) related advisory activities in the professional and public fields.

International Contributions. Our faculty contribute broadly to international translational research programs at academic institutions, industry and biotechnology, and related organizations. In research, our faculty collaborate widely with investigators around the world in North America, South America, Europe, Africa, Middle East, and Asia at academic Universities and research institutions, industry, private foundations, and related organizations. In teaching, our faculty contribute to teaching at international conferences, mentorship of graduate students at PhD programs worldwide, internships for international students, mentors for visiting scientists, and related international activities. In service, our faculty contribute to the international field by providing database resources of drug structural and computational information, by assessing climate change effects on the world’s environment and health, and related.

Additional examples of contributions to the scientific community include the following Drug-related Database Resources:

Computational mass spectrometry and MassIVE resource. The Mass spectrometry Interactive Virtual Environment (MassIVE) is a public repository for storing, documenting and re-analyzing mass spectra for identifications combined with broad statistical methods and software for quantitative proteomic workflows. This repository expands the capabilities of the field allowing more accurate statements about biological functions in human disease.

BindingDB database. BindingDB is an open knowledgebase of protein-small molecule interactions as drug molecules and probes for biological systems. Automated and human methods conduct accurate extraction of large volumes of data from scientific articles and patents that are rendered into a publicly available open-source database via the searchable BindingDB website. The database of information is useful for research and teaching including pharmacology, drug discovery, and computational chemistry.

GNPS: Global Natural Product Social Molecular Networking Community. GNPS is a web-based mass spectrometry ecosystem of an open-access knowledge base for community-wide organization and sharing of raw, processed, or annotated fragmentation mass spectrometry data (MS/MS). GNPS facilitates identification and discovery of drugs and metabolites.

Closing Summary
Overall, our faculty are renowned international experts in pharmacy and pharmaceutical sciences and impact the world in scientific, clinical and educational advances. This proposal has presented outstanding qualities of SSPPS activities in education, research, and service that fully support the plan to form the Department of Pharmacy Practice and Sciences
and the Department of Pharmaceutical Sciences. Establishment of these Departments emphasize the dedication of UC San Diego for training students in clinical pharmacy and pharmaceutical sciences for drug discovery and development. The SSPPS Departments will attract the best faculty, staff and students to our top-notch health professional and graduate degree programs. The Departments of SSPPS together with campus, SIO, Health, and Health Sciences at UC San Diego demonstrate excellence in education, patient care, professional service and research, improving the lives of diverse populations around the world.
October 2, 2023

Elizabeth Simmons, PhD
Executive Vice Chancellor-Academic Affairs
UC San Diego
MC 0001

Dear Dr. Simmons:

I am pleased to write this strong letter of support for the creating of two independent academic departments within the Skaggs School of Pharmacy and Pharmaceutical Sciences, the first such academic units within the school. I believe this represents a natural progression from a series of shared strategic conversations with Dean Brookie Best and a reflection of its growth and maturity since its establishment in 2002. This transition additionally has unanimous support from the Health Sciences Faculty Council.

Pharmacy’s evolution has accelerated over the past several years, and its faculty, students, and residents have been strong partners to our tripartite mission. Its programs have not only become highly recognized by its peers but have also maintained an exceptional level of quality, as evidenced by numerous campus-wide teaching awards. Its research portfolio continues to grow and clearly has strong synergies with allied units including Chemistry/Biochemistry, Neurosciences, Pediatrics, Pharmacology, and the Scripps Institution for Oceanography. This is reflected in the number of joint faculty recruited to Skaggs over the past few years, including through campus-wide programs like the Advancing Faculty Diversity and FIRST Award Program initiatives. Earlier this year, Pharmacy was named one of the top 5 schools for research by the American Association of Colleges of Pharmacy.

I remain strongly supportive of Dr. Best’s vision of the school and her plans for its development. This transition reflects the distinct training and academic cultures within Skaggs and mirrors the organization of other UC institutions and every other top 25 pharmacy school. (Notably, the two departments would have roughly the same number of faculty members representing the school’s development in both clinical and scientific disciplines.) This proposal establishes a stronger administrative infrastructure that will not only provide greater alignment with its regional and national peers, but also foster new opportunities for faculty leaders within the school to participate in driving its strategic plan forward. It will also allow for each department to strengthen its own identity with the ability to further grow the school across multiple focus areas.

I am confident that creating the Department of Pharmacy Practice and Sciences and the Department of Pharmaceutical Sciences will ensure Skaggs continues to thrive as an integral part of the Health Sciences, and will bring further academic, educational, and clinical recognition to UC San Diego. I support this proposal with enthusiasm and without reservation and would be happy to discuss this further at your request.

Sincerely,

John M. Careathers, MD
Vice Chancellor for Health Sciences

cc: R. Continetti
    J. Hildebrand
    R. Ross
September 14, 2023

PRADEEP K. KHOSLA  
Chancellor  
University of California San Diego  
MC 0005

BROOKIE M. BEST, PHARMD, MAS  
Dean  
Professor of Clinical Pharmacy and Pediatrics  
Skaggs School of Pharmacy and Pharmaceutical Sciences  
Department of Pediatrics, School of Medicine – Rady Children’s Hospital San Diego  
MC 0657

Subject: Proposal for the Formation of Two Departments Within the UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences

Dear Chancellor Khosla and Dean Best,

The Health Sciences Faculty Council (HSFC) writes this letter to endorse and facilitate the approval of the proposal for the formation of two departments, the Department of Pharmacy Practice and Sciences and the Department of Pharmaceutical Sciences, within the UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences as proposed.

On September 5, 2023, during the HSFC’s meeting, Dean Best gave a detailed presentation of the proposal and answered questions from council members. After discussion and thorough review, the HSFC unanimously endorsed the proposal via an e-vote.

Sincerely,

Kristin Mekeel, MD  
Chair, Health Sciences Faculty Council

CC: John M. Carethers, M.D., Vice Chancellor for Health Sciences  
    Robert S. Ross, M.D., M.B.A., Assistant Vice Chancellor, Health Sciences Academic Affairs
Dr. Jacinda Abdul-Mutakabbir is currently an Assistant Professor of Clinical Pharmacy at the University of California San Diego in the Skaggs School of Pharmacy and Pharmaceutical Sciences and the Division of the Black Diaspora and African American Studies. She completed her Doctorate in Pharmacy at the University of Saint Joseph School of Pharmacy, located in Hartford, CT. Following pharmacy school, she completed her pharmacy residency at the Howard University Hospital in Washington, DC. She also completed an Infectious Disease Pharmacokinetics/Pharmacodynamics (PK/PD) Research Fellowship under the tutelage of Dr. Michael J. Rybak PharmD, MPH, PhD, and went on to earn a Masters of Public Health at Wayne State University in Detroit, MI. Her research in mitigating antimicrobial resistance has led her to be recognized by the European Congress of Clinical Microbiology and Infectious Diseases as one of their 30 under 30 outstanding young scientists, for their ECCMID 2021 31st annual meeting. Dr. Abdul-Mutakabbir is also dedicated to magnifying and rectifying health inequities in minoritized communities. To that point, she currently serves as the Lead Pharmacist and Educator for Congregations Organized for Prophetic Engagement-Health Equity Collaborative.

Dr. Abdul-Mutakabbir’s research utilizes a two-fold approach to explore the intersection of antibiotic resistance, and health/vaccine equity; with a specific focus on racial differences observed across racially and ethnically minoritized groups. With this, her scholastic contributions are focused into three very distinct categories, vaccine equity, equity in pharmacy and medicine, and the utilization of antimicrobial synergistic activity to overcome multidrug-resistant organisms. Currently, she serves as the lead pharmacist for the low-barrier community vaccination clinics held within the Black and Hispanic/Latino communities. The methods for the completion of these clinics have served as a basis for her vaccine equity research and have been published in The Lancet Global Health amongst other journals. Of note, more than 3,000 vaccination doses have been provided to racially and ethnically minoritized individuals, under her direct guidance, within these clinics. Jacinda has received numerous national awards for her contributions and research in the vaccine equity clinics, and the work as well as her expertise on health and vaccine equity has been documented in several top-ranking news sources including NPR, The Atlantic, US News, Scientific American, and the Daily Mail. Jacinda’s work and research to expand vaccination efforts to increase uptake and confidence amongst people with substance use disorders is also featured on the National Institutes of Health, National Institute on Drug Abuse web page, Jacinda was appointed to the CVSH National Health Equity Advisory Board as a Pharmacist Expert based on her published research on vaccine equity.

Jacinda is currently involved in several mentorship and sponsorship programs (including the Pharmgrad Wishlist), designed to reduce disparity gaps for racially and ethnically minoritized pharmacy students as they matriculate through the profession. She has collaborated with a variety of authors, representing numerous disciplines within healthcare, to advocate for diverse, equitable, and inclusive initiatives for minoritized students and practicing professionals. Of note, two manuscripts that she served as an author on were included on the AJHP Top 25 Journal Articles of 2021 list.

Finally, in several collaborative efforts, Jacinda evaluated the synergistic activity of combination antimicrobial regimens against microbes in which advanced mechanisms of resistance were identified. For these projects, she was integral to the completion of both static and dynamic pharmacokinetic and pharmacodynamic experiments, simulating human parameters, to assess the therapeutic enhancement of the antibiotic combination regimens against Gram-positive and Gram-negative organisms including Staphylococcus aureus, Enterococcus spp., Enterobacteriaceae, Acinetobacter baumannii, and Pseudomonas aeruginosa. Several projects have included novel antibiotics and treatment modalities, such as bacteriophage, as the base for the
investigated combination regimens. As antimicrobial resistance is a growing public health threat, continued research that optimizes their use and defines mediators of resistance of the

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<tr>
<th>Dr. Rabia Atayee</th>
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<td>Dr. Atayee’s major research focus is in the area of pain and palliative care with a minor research focus in the area of pharmacy education. She has established several collaborations with other clinical researchers in the areas of:</td>
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<tr>
<td>• Identifying novel pain and symptom management treatments.</td>
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<td>• Developing national practice guidelines for safe and effective analgesia including opioid therapies.</td>
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<td>• Highlighting pharmacists’ role as providers and positive outcomes in an interdisciplinary clinical setting.</td>
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<td>• Developing mentorship programs for future pharmacist with a focus in underserved communities.</td>
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<td>• Working towards eliminating health inequities in pain and symptom management.</td>
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<th>Dr. Linda Awdishu</th>
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<td>Dr. Awdishu’s research program involves pharmacokinetics of drugs and dosing in kidney disease. Currently, Dr. Awdishu is co-directing The International Drug Induced Renal Injury Consortium (DIRECT) in collaboration with The International Serious Adverse Event Consortium (iSAEC).</td>
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<td>DIRECT will investigate the genetic basis of serious drug induced renal injury, through a collaborative network comprised of leading clinical research centers from around the world.</td>
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<th>Dr. Brookie Best</th>
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<td>Dr. Best specializes in pharmacokinetics – the processes by which a drug is absorbed, distributed, metabolized and eliminated by the body – and pediatric clinical pharmacology research. Her research efforts have focused on studying anti-HIV drugs in infants, children, adolescents, non-pregnant adults, and pregnant women. She also studies drugs used to treat Kawasaki disease, the leading cause of acquired heart disease in children. She has specific interests and expertise in maternal-fetal and pediatric clinical pharmacology, therapeutic drug monitoring of antiretrovirals, antiretroviral pharmacogenomics, and penetration of antiretrovirals into the central nervous system.</td>
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<td>Dr. Best's research program encompasses projects with key state-wide, national and international HIV/AIDS and pediatric pharmacology collaborative research networks, including the:</td>
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<td>• International Maternal Pediatric Adolescent AIDS Clinical Trials network (IMPAACT)</td>
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<td>• Maternal and Pediatric Precision in Therapeutics (MPRINT)</td>
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<td>• California Collaborative Treatment Group (CCTG)</td>
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<td>• HIV Neurobehavioral Research Program (HNRP)</td>
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<th>Dr. Mark Bounthavong</th>
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<td>Dr. Bounthavong’s research interests include pharmacoeconomics, program and implementation evaluations, applied econometrics, and evidence-synthesis using Bayesian methods. More recently, Dr. Bounthavong’s research has centered around evaluating academic detailing’s impact on aligning provider’s behavior with evidence-based practice, particularly with the opioid epidemic.</td>
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<th>Dr. Brandl</th>
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<td>Dr. Brandl’s research mainly focuses on educational innovations in the classroom. She is interested in understanding how students effectively learn core concepts within the pharmacy curriculum. Dr. Brandl develops new teaching methods to promote student learning. She is a designated pharmaceutical teacher with the main goal in striving excellence in pharmacology education.</td>
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<td>Dr. Brandl is the course director of the “Principles of Pharmacology and Physiology” (PPP) core course for students of Pharmacy in their second year. In the School of</td>
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<td>Name</td>
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| **Dr. Katharina Brandl** | Medicine, Dr. Brandl serves as the Pharmacology Thread Director and oversees pharmacology education for the entire first and second year core curriculum for medical students.  
After becoming a registered pharmacist in Germany, she finished her PhD in Immunology/ Infectious Diseases. She performed her post-doctoral studies with Dr. Eric Pamer (Memorial Sloan Kettering Cancer Center, New York) and the Nobel laureate Dr. Bruce Beutler (The Scripps Research Institute, La Jolla). During her career, she enjoyed mentoring undergraduate and graduate students and teaching pharmacy and medical students (core courses in pharmacology, immunology, molecular biology, pharmaceutical biology and pharmacognosy). |
| **Dr. Charles Daniels** | Dr. Daniels’ research focus has been in pharmacoeconomics, safe medication systems, medication use quality, and quality pharmacy patient care. Recent work has evaluated the role of technologies in medication error reduction and patient-pharmacist interaction. His team is also examining use of multihospital data in the drug costs and improved outcomes. Dr. Daniels is a founding member of the Steering Committee for the Pharmacoeconomics Forum at UC San Diego. |
| **Dr. Ashley Feist** | Dr. Feist graduated from University of Nebraska Medical Center in 2005 and completed her residency training at UC San Diego Health. Post-residency, she worked as a Pharmacist Specialist in Solid Organ Transplantation at UC San Diego Health focusing on heart and lung transplantation in both inpatient and ambulatory care settings. In this role, she implemented and expanded clinical pharmacy services for all transplant programs. She was the founding chair for the UC Wide Solid Organ Transplant Pharmacist Collaborative Committee providing a network for transplant pharmacists at all University of California campuses. She developed the PGY2 Solid Organ Transplant Residency at UC San Diego Health acting as the director for nine years.  
Dr. Feist joined UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences in 2020 as a Health Sciences Associate Clinical Professor. In addition to teaching, she continues to provide patient care in the ambulatory setting for both the lung and heart transplant programs at UC San Diego Health. Her research focuses on clinical outcomes in transplantation, specifically studying pharmacokinetics, drug interactions and adverse effects. Dr. Feist is a Board Certified Pharmacotherapy Specialist (BCPS). |
| **Dr. Eduardo Fricovsky** | Dr. Fricovsky’s research interest includes diabetic cardiomyopathy and the effects of enzymatic protein glycosylation (O-GlcNAc) in type 2 diabetic mouse hearts and their influence on cardiac function. Also, conducts studies related to the expression of O-GlcNAcase (GCA) an enzyme that removes excessive O-GlcNAc modification and protection against diabetic cardiomyopathy. Furthermore, he examines the role of GCA gene expression and O-GlcNAc levels in non-diabetics and diabetic patients at the UC San Diego Student-Run Free Clinic. |
| **Dr. Laura Hart** | Prior to joining the faculty at SSPPS in September 2018, Dr. Hart completed a PGY2 Residency and Fellowship in Geriatric Pharmacotherapy and served as an instructor in the PharmD program at the University of Washington School of Pharmacy. Her research aims to optimize medication use in older adults, particularly using pharmacoepidemiologic methods to examine risks and patterns of medication use in older adults. Her research to date has specifically focused in the areas of central nervous system-active medications, falls, and dementia. She is also interested in the implementation and evaluation of innovative pharmacy practice models in the care of older adults. In addition, she has an interest in the scholarship of teaching and learning. Further, she is passionate about justice, equity, diversity, and inclusion, with a focus on the LGBTQIA+ community. Dr. Hart is a Board Certified Pharmacotherapy Specialist (BCPS) and Board Certified Geriatric Pharmacist (BCGP). |
I began my career as faculty member at the University of Pittsburgh in 2016. In 2021, I joined UC San Diego as an Associate Professor with tenure. My research has focused on evaluating clinical and economic outcomes of oral anticoagulant agents and studying pharmaceutical pricing. I have published over 80 peer-reviewed manuscripts with more than 60 as first or senior author. Some of these articles have been published in top-tier journals, including JAMA, Annals of Internal Medicine, JAMA Internal Medicine, and Health Affairs. My research has been featured in the main media outlets, including New York Times, Washington Post, NPR, CNN, Forbes, BBC, ABC, CNBC, or Bloomberg. I am the PI of a K01 and an R01 award on anticoagulation use in atrial fibrillation. My drug pricing research is funded by West Health Policy Center.

I was tenured and awarded my first R01 as PI at the age of 30. In 2021, I became the first pharmacist to be recognized with the Academy Health Alice S. Hersh Emerging Leader Award. In 2018, I was named one of the “30 under 30” young leaders in healthcare research by Forbes Magazine. I am a Fellow of the American College of Cardiology and the American Heart Association Academic Achievements.

Dr. Inmaculada Hernandez

Dr. Humber is currently a faculty preceptor at UC San Diego’s Sulpizio Cardiovascular Center teaching pharmacy students and residents in the acute care setting. His primary research interests include investigations into novel antiplatelet therapies utilizing genetic and point-of-care testing to characterize or predict cardiovascular endpoints. Other research interests include examinations into the management of acute coronary syndromes, new and emerging antithrombotic agents, and investigations into the prevention and treatment of venous thromboembolism. Dr. Humber joined the faculty at UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences in July 2011.

Dr. Douglas Humber

Prior to joining the faculty at SSPPS in January 2022, Dr. Kneebusch completed PGY1 Acute Care and PGY2 Psychiatric Pharmacy Residencies at the VA San Diego Healthcare System. Following her completion of residency, she practiced as an inpatient psychiatric pharmacist for 2 years and as a population health behavioral health pharmacist for an Arizona based Medicaid and Medicare insurance provider.

Her research aims to optimize and expand care for patients with psychiatric disorders, including assessing available therapies in treatment and implementation and evaluation of pharmacy practice models for those with comorbid psychiatric diagnoses and substance use disorder. Additionally, she has interests in student and professional wellness and promotion of Diversity, Equity, and Inclusion. Dr. Kneebusch is a Board-Certified Pharmacotherapy Specialist (BCPS) and Board-Certified Psychiatric Pharmacist (BCPP).

Dr. Jamie Kneebusch

Dr. Jennifer Le is Professor of Clinical Pharmacy at the University of California, San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences. She received her Bachelor of Science in Biology from University of California, Los Angeles in 1995; PharmD from University of California, San Francisco in 2000; and Masters in Clinical Research from University of California, San Diego in 2012. As a board-certified pharmacotherapy specialist with added qualification in infectious diseases since 2007, Dr. Le has been involved in clinical pharmacy services in pediatric infectious diseases and patient-oriented research over 20 years. She was an invited member of the federal advisory board for the Food and Drug Administration’s (FDA) Antimicrobial Drugs Advisory Committee that makes official recommendations to FDA about safety and efficacy of antibiotics for use in the United States from 2018 to 2022. She is currently an invited member of Healthcare Patient Safety and Quality Improvement Research Study Section for the Agency for Healthcare Research and Quality (AHRQ) and Patient-Centered Outcomes Research Institute (PCORI); expert panel member for Pediatric ECMO Anticoagulation Collaborative (PEACE) Consensus Guidelines; an advisory board member of the Asian Pacific Health Foundation; has also been a member of an NIH Special Emphasis Panel and participates in Scientific Review Groups; is an invited editorial board member for Pediatric Pharmacotherapy, Pharmacotherapy Journal, Pediatric Medicine and Infectious Diseases and Therapy Journal; and invited program reviewer for the national board certification programs through the American College of Clinical Pharmacy, including Self-Assessment Programs in Pediatrics (PedSAP), Ambulatory Care (ACSAP), and Pharmacotherapy (PSAP).

Dr. Jennifer Le
Dr. Le’s primary research encompasses three domains: (1) the appropriate and safe use of antibiotics and antifungal agents, (2) clinical pharmacology, and (3) outcomes associated with resistant infections in pediatrics across the wide age spectrum from infancy (including critically ill premature neonates) to adolescence. She specializes in pharmacokinetics – the processes by which a drug is absorbed, distributed, metabolized and eliminated by the body – and pediatric clinical pharmacology research. She has published over 135 articles in reputable medical and pharmacy journals and books, including Pediatrics, Journal of Pediatrics, and Merck Manuals and serves as the second author of the current vancomycin guidelines endorsed by the American Society of Health-System Pharmacists, Infectious Diseases Society of America, Pediatric Infectious Diseases Society and Society of Infectious Diseases Pharmacists. Dr. Le was a past recipient of the American College of Clinical Pharmacy’s Investigator Development Award and the K23 Career Development Award from the National Institutes of Health for her research in pharmacokinetic-pharmacodynamic modeling of antibiotics in children. She also serves as an investigator for pharmacokinetic studies through the RO1, U54 & T32/34 award mechanisms for developmental and translational pharmacology of pediatric antimicrobial therapy funded by the National Institutes of Health. She was bestowed the honor of fellow of the Infectious Diseases Society of America, American College of Clinical Pharmacy and California Society of Health Systems Pharmacists; and received awards such as Sternfels Prize for Drug Safety Innovation and Outstanding Mentor at University of California, San Diego Faculty Mentor Program. Dr. Le is most proud of her passion and continued effort to improve pediatric health and wellness extending globally through her humanitarian work in Vietnam, Taiwan and for Jordan over the past 15 years.

Dr. Lee’s specialty area is psychiatric pharmacy and she is a Board-Certified Psychiatric Pharmacist. She is currently the Residency Program Director of the PGY2 Psychiatric Pharmacy Residency at UC San Diego. Dr. Lee’s research program involves the 1) effective utilization of psychotropic medications within diverse patient populations, 2) establishing innovative psychiatric practice models, 3) scholarship of teaching and learning and 4) assessment and prevention of burnout and suicide among healthcare trainees and professionals. She practices in the General Psychiatry clinic at UC San Diego with emphasis on "mood and anxiety" disorders and adult ADHD. She established the first pharmacist-run outpatient psychiatric clinic at UC San Diego and practices under a Collaborative Practice. She has also served as the Director of the PharmGenEd™ Training for Health Professional Schools.

Dr. Luli is an Assistant Clinical Professor at the University of California San Diego, Skaggs School of Pharmacy and Pharmaceutical Sciences where he teaches in various courses, including a self-care pharmacy practice course provided to first-year student pharmacists. He practices in a community pharmacy, as well as an interdisciplinary care clinic serving uninsured and underserved patients. He is the Director for Introductory Pharmacy Practice Experiences (IPPEs), as well as the Residency Program Director for the PGY1 Community Pharmacy Residency. He enjoys precepting pharmacy learners of all levels, from undergraduate students interested in the profession to pharmacy residents. Dr. Luli’s interests include immunizations, advancing patient care services in the community setting, enhancing experiential training for students and residents, and public awareness and outreach regarding safe and proper use of medications, herbals, and supplements.
| Dr. Joseph Ma | Dr. Ma’s research interests are in examining methods that evaluate drug-drug interactions. His research has elucidated that several methods estimating in vivo, real-time, drug-metabolizing enzyme and transporter activity are inadequate and lack optimal validation. Dr. Ma is also interested in examining pain medication pharmacokinetic and pharmacodynamic variability in opioid-treated, cancer patients. Dr. Ma's clinical practice is in pain and palliative care in an outpatient, multidisciplinary clinic at the Moores Cancer Center. Under a collaborative practice protocol, Dr. Ma sees patients and is able to start, stop, or modify therapy to treat symptoms and side effects of a disease and its treatment. |
| Dr. Christina Mnatzaganian | Dr. Mnatzaganian’s primary research interests are in pharmacy education and wellness, the scholarship of teaching and learning, self-care, public health issues, and chronic disease management. She is board certified in Ambulatory Care and practices in ambulatory care pharmacy at the UC San Diego Health Lewis Family Medicine Clinic in conducting disease management for diabetes, hypertension, hyperlipidemia, anticoagulation, asthma, etc. She is the Director for Advanced Pharmacy Practice Experiences. |
| Dr. Candis Morello | Dr. Morello's research program involves exploring clinical outcomes in people with diabetes and associated disorders (cardiac, renal, neuropathy, dyslipidemia), and educational or wellness outcomes of student pharmacists. Dr. Morello maintains a practice as a Clinical Pharmacist Provider at the Veterans Affairs San Diego Health System where she is Director of the Diabetes Intense Medical Management Clinic. She studies the impact of pharmacist-run diabetes comprehensive medication management services on the metabolic, quality of life, patient satisfaction, medication adherence, pharmacoconomics, medication complexity, mental health, medication use patterns/cost and long term clinical outcomes. Dr. Morello also conducts research on the effectiveness of the educational models and wellness. |
| Dr. Jennifer Namba | Dr. Namba is currently a Transitions of Care pharmacist at UC San Diego Healthcare System. Prior to joining the faculty at UC San Diego SSPPS, Dr. Namba served as the medical ICU pharmacist at UC San Diego Hillcrest hospital and as a faculty preceptor for the ICU and cardiology rotations. Her primary research interests reside within acute care (specifically critical care and heart failure), resuscitation, and transitions of care. She is also interested in the role of simulation in pharmacist training. Dr. Namba joined the faculty at the UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences in February 2012. |
| Dr. Nathan Painter | Dr. Painter joined the faculty at the UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences in September 2009 where he is a course coordinator and teaches in the Pharmacy Practice courses. Dr. Painter is a Certified Diabetes Care and Education Specialist and co-director of clinical pharmacy services at UC San Diego Family Medicine Clinics. He also provides remote care via telehealth. Dr. Painter’s research areas of focus include measuring the impact of pharmacist interventions in diabetes, hypertension, hyperlipidemia, prescription drug abuse, suicide prevention, and safe medication usage in patient populations. |
| Dr. Nimish Patel | Dr. Nimish Patel's main research interest involves evaluating clinical outcomes associated with anti-infective medications. Dr. Patel's research encompasses three domains: 1) comparative safety and effectiveness of antimicrobials in real-world settings, 2) predictors and outcomes of patients with contraindicated drug-drug interactions and 3) pharmacoeconomic strategies of emerging antimicrobial agents that result in a cost savings relative to existing medications associated with a high frequency of costly toxicities or prolonged hospitalization. Dr. Patel's clinical areas of expertise are treatment of hospitalized patients with infectious diseases, pharmacokinetic monitoring of antimicrobials, antibiotic stewardship, HIV consult service and hepatitis C. Some of his current research projects include: real-world safety and effectiveness of fluoroquinolones versus ceftriaxone/azithromycin for patients with community acquired infections. |
pneumonia, incidence and predictors of outcomes among patients with diabetic foot infections, and effect of exogenous hormones on renal function and drug concentrations in transgender patients using pre-exposure prophylaxis.

Dr. Saunders is a Board Certified Oncology Pharmacist working in the Blood & Marrow Transplant clinics at Moores Cancer Center (MCC). Prior to joining the faculty at SSPPS in August 2014, Dr. Saunders was a Clinical Pharmacy Specialist at MD Anderson Cancer Center (MDACC) and practiced in the department of Stem Cell Transplant and Cellular Therapy (SCTCT) for 6 years.

Dr. Ila Saunders

Dr. Singh is a founding faculty at SSPPS, certified diabetes care and education specialist and co-founder of the Diabetes Management and Education Clinic at UC San Diego Health (UCSDH) primary care clinics. She is also the Associate Dean for Experiential Education. Her clinical expertise is in diabetes management and education. She initiated and developed clinics in Pharmacotherapy, Tobacco Cessation, Diabetes Management, Hypertension Management, and Medicare Part D. In addition, she has practiced in an Asthma Clinic, Anticoagulation Clinic, Geriatric Assessment Team, and an Adult Internal Medicine Clinic. Dr. Singh co-founded and runs a nationally accredited Diabetes Management and Education program, where she manages patients with poorly controlled type 2 diabetes for primary care and specialty providers at UCSDH.

Dr. Renu Singh

Dr. Tsunoda’s research focuses on using metabolomics to investigate factors influencing the variability of drug metabolism and pharmacokinetics. Her group is interested in the intersection of drugs and the gut microbiome – pharmacomicrobiomics. She is one of the Principle Investigators of the UC San Diego Center of Excellence in Therapeutics for MPRINT (Maternal and Pediatric Precision in Therapeutics) Hub where she is investigating the impact of antibiotic exposure through breastfeeding on the infant microbiome, metabolome, and development. Previous work has included investigating the impact of altering the gut microbiome with antibiotics on drug metabolizing activity and using probe compounds such as midazolam and cyclosporine to predict activity of CYP3A4, the major drug metabolizing enzyme in the intestine and liver, as well as clinical pharmacology investigations with immunosuppressive agents. Her group is also investigating the use of noninvasive techniques to monitor drugs and other chemicals in pregnancy, infancy, and healthcare workers.

Dr. Shirley Tsunoda

Prior to joining SSPPS as an assistant clinical professor of pharmacy, Dr. Yousif completed a post-doctoral fellowship in biomedical informatics at the Department of Biomedical Informatics, UC San Diego School of Medicine, and a second post-doctoral fellowship in health economics and outcomes research at the University of Illinois Chicago School of Pharmacy, and Takeda Pharmaceuticals. Dr. Yousif’s research is broadly interested in adverse drug events (ADEs), with a particular interest in drug-induced kidney injury (DI-AKI) in adult and pediatric patients. Future research efforts are focused on utilizing electronic health record (EHR) data from large nationwide data repositories to elucidate the risk of DI-AKI in patients treated with nephrotoxic drugs.

Dr. Zaid Yousif

Dr. Yousif has several ongoing research projects in 1) identifying the clinical characteristics and predictors of DI-AKI in adult and pediatric patients; 2) identifying predictors of hospital readmission of AKI patients; 3) Evaluating health outcomes in cancer patients receiving intravenous immunoglobulin therapy; 4) investigating the efficacy and safety of advanced therapy in patients with moderate to severe Crohn’s disease.
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<th>Name</th>
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<td>Dr. Ruben Abagyan</td>
<td>Dr. Abagyan’s research focuses on the development of novel technologies for structure-based drug discovery and optimization, structural systems biology for target finding and protein modeling. The lab screens specific biomedical targets to discover new drug leads, and validate them experimentally. The applications include cancer, neurodegeneration, parasitic, viral and endocrine diseases. To extend the reach of docking we model alternative functional states and allosteric pockets of the kinases, GPCRs and Nuclear Receptors. We derived comprehensive sets of ligand pockets (the Pocketome) competing for ligands and metabolites in different organisms. These data are used for target identification and multi-target pharmacology profiling. We dock drugs, leads and environmental chemicals to the ‘anti-target’ models to predict endocrine disruption and other adverse effects. We also identify new promising uses of existing drugs on the basis of the multi-target pharmacology.</td>
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<td>Dr. Carlo Ballatore</td>
<td>Our laboratory is engaged in collaborative, multidisciplinary probe- and drug-discovery programs. We specialize in the design and synthesis of small molecules as research tools or candidate therapeutics for a variety of human diseases. Our work typically involves Structure Activity and Structure Property Relationship (SAR/SPR) studies. These efforts are often directed towards the identification and development of probes suitable for mode of action studies, as well as candidate compounds optimized for pharmacokinetic and pharmacodynamic properties that could enable in vivo proof-of-concept studies or other preclinical evaluations of efficacy and safety. Over the past several years the primary focus of our research has been in the area of CNS drug discovery with specific programs directed towards the discovery and development of candidate treatments for: (a) neurodegenerative tauopathies (e.g., Alzheimer’s disease), in collaboration with the Center for Neurodegenerative Diseases Research (CNDR) at University of Pennsylvania; and (b) neuroparasitic infections (e.g., African Sleeping Sickness), in collaboration with the Center for Discovery and Innovation in Parasitic Diseases at UC San Diego. In addition, our laboratory has been actively involved in the investigation of basic, fundamental principles in medicinal chemistry, such as in the area of isosteric replacements. Over the past several years, the primary focus of our research has been in the area of Alzheimer’s disease and related neurodegenerative tauopathies with specific programs directed towards the discovery and development of (a) tau aggregation inhibitors, (b) microtubule-stabilizing agents, and (c) thromboxane A2 receptor antagonists. The laboratory has also been actively involved in the investigation of basic, fundamental principles in medicinal chemistry, such as in the area of isosteric replacements.</td>
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<td>Dr. Nuno Bandeira</td>
<td>The Bandeira laboratory aims to develop novel mass spectrometry algorithms for the discovery and characterization of novel biomarker proteins, post-translational modifications and protein-protein interactions. The research in my lab falls into 5 general areas: (1) De novo sequencing of complete proteins; our Shotgun Protein Sequencing paradigm yields the longest and most accurate de novo sequences, even on mixtures of unknown proteins. (2) Discovery and detailed characterization of post-translational modifications in signaling pathways and health/disease; our Spectral Networks paradigm enables the precise localization of modification sites and reveals novel modifications and highly modified peptides. (3) Sequencing and characterization of non-linear peptidic natural products, including cyclic and branched peptides; (4) Mass spectrometry algorithms for high-throughput analysis of in-vivo structural proteomics and protein-protein interactions; (5) New mass spectrometry approaches to the identification of neuropeptides and other endogenous peptides; biomarker and drug discovery pipelines are severely limited by only identifying 20-30% of all detectable peptide species – new combinations of algorithms and experimental protocols are needed to reveal this proteomics ‘dark matter’. Overall, this research aims to substantially improve the capabilities of proteomics discovery pipelines and could result in the development of novel drug therapeutics.</td>
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<td>Parasitic diseases associated with poverty, including the neglected tropical diseases, are overlooked in terms of the number, efficacy and safety of the drugs available for treatment. As part of the Center for Discovery and Innovation in Parasitic Diseases (CDIPD), and with a focus on schistosomiasis, African trypanosomiasis and hookworm disease, three broad themes underpin my team’s research: (1) the identification and validation of protein targets for drug development; (2) the pre-clinical and translational development of drugs,</td>
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Dr. Conor Caffrey

including the development and application of associated technologies (high-content and high-throughput screening platforms, Machine Learning, protein expression and animal models of infection); and (3) the development of point-of-care (POC) diagnostics. To facilitate our cross-disciplinary research interests, my team collaborates with academia and the pharmaceutical industry worldwide, including with bioinformaticians, medicinal and clinical chemists, structural biologists and automated systems specialists. Finally, with international partners, my team is actively engaged in training and capacity building with researchers from low-/middle-income countries to translate drug discovery practices and technologies back to their home institutions.

Dr. Edmund Capparelli, RTAD

Dr. Capparelli specializes in pharmacometrics - the use of mechanistically based mathematical models to describe the time course of drugs in the body (PK-pharmacokinetic models), the effects that drug concentrations have their targets in the body (PD-pharmacodynamic models); and overall impact of drug effects have on disease and symptoms (DZ-disease models). A major emphasis of Dr. Capparelli’s research has been to understand developmental, genetic, environmental and other factors that lead to PK and PD differences in infants, children and adults. His works includes novel approaches to therapies for infectious diseases including mono-clonal antibodies and long-acting formulations. In particularly, Dr Capparelli has designed and performed numerous international studies for the prevention and treatment of HIV infection and its complications in infants and children.

Dr. Geoffrey Chang

Our research has been mostly focused on determining the x-ray structures of the four classes of multidrug resistance (MDR) transporters found in nature where the drug binding sites reside in the cell membrane. These crystal structures include a mammalian MDR ATP-Binding Cassette (ABC) transporter called P-glycoprotein (Pgp), three distinct structural conformations of a lipid ABC transporter called MsbA; the Small Multidrug Efflux (SMR) transporter EmrE with tetraphenylphosphonium (TPP); the Major Facilitator Superfamily (MFS) MDR transporter EmrD; and the Multi-Antimicrobial Toxin Extrusion (MATE) MDR transporter NorM. These drug efflux pumps confer resistance in the treatment of several bacterial infections, cancers, and HIV. Taken together, the x-ray structures of these MDR transporters reveal a common theme in their molecular structural biology. For example, all these transporters have hydrophobic and aromatic side-chains in their poly-specific binding pockets. Our findings have also revealed that their molecular structures are all V-shaped with substrate-entry portals that open towards the lipid bilayer. The positions of these portals enable these transporters to extract hydrophobic substrates directly from the inner membrane leaflet. Upon structural rearrangement to an outward-facing conformation, they present the substrates to the outer membrane leaflet or to outside. The x-ray structures of multiple conformations of MDR ABC transporters have also demonstrated that they are indeed very flexible molecules that can accommodate the binding of large substrates. These structures provide a molecular structural framework for understanding poly-specific drug binding and the mechanics coupling ATP binding/hydrolysis with substrate transport.

The laboratory has a very high commitment to develop innovative techniques for overcoming the challenges of producing and crystallizing integral membrane proteins suitable for biophysical analysis. The lab is also a major component of NSF funded center called CROPS: Center for Research On Plant Transporters. The focus of our center is to provide high-affinity binders and solve the x-ray structures of plant transporters relevant for food, and human. We also have structure-function projects focused on drug transporters important for multidrug resistance and drug efficacy as well as transporters for parasites causing malaria. We are pioneering a new method for evolving molecular scaffolds (synthetic affinity maturation), which include antibodies funded by the NIH Eureka mechanism. We are also introducing and re-engineering oil transporters to secrete alkanes and other biofuel substrates partnership with the US Air Force Research Laboratory.

My research interests can be categorized into two broad areas: (1) Development of new antimicrobials for parasitic diseases. Amebiasis, giardiasis Primary Amebic Meningoencephalitis (PAM) and Acanthamoeba keratitis, caused by the protozoan pathogens Entamoeba histolytica, Giardia lamblia, Naegleria fowleri (brain-eating ameba) and Acanthamoeba castellanii continue to be the major causes of morbidity and mortality. Colitis and diarrhea are the most common manifestations of amebiasis and giardiasis and PAM contributes to extensive inflammation and hemorrhage of the brain. Acanthamoeba
| Dr. Anjan Debnath | Keratitis is a painful eye infection that can lead to blindness and occurs in healthy individuals wearing contact lenses. My research on drug discovery uses a two-pronged approach, combining a strategy of repurposing compounds that are already in clinical development along with development of compounds with novel scaffolds and improved activity against the parasites. This approach encompasses both robotic-driven technology and close interaction with multiple academic groups, pharmaceutical company partners and non-profit organizations. This aligns well with the mission of the Center for Discovery and Innovation in Parasitic Diseases (CDIPD), which is to discover and develop drugs for neglected parasitic diseases. (2) Studies on molecular mechanism of pathogenesis. E. histolytica, N. fowleri and Acanthamoeba are remarkable organisms with phagocytic and proteolytic capabilities, invading colonic mucosa, human brain and eyes. We are using these model systems to identify or validate key virulence factors contributing to colonic, brain, and eye infections. In addition, we are using designed small molecule inhibitors to probe the function of important proteins, such as cysteine protease, heat shock protein 90, thioredoxin reductase, steroidogenic enzymes in Entamoeba, Naegleria and Acanthamoeba biology. These studies are providing important new clues about how a pathogen orchestrates responses to the host environment and the knowledge generated in these studies has the potential for generating new types of therapeutics for the treatment of amebiasis, PAM and Acanthamoeba keratitis. |

| Dr. Pieter Dorrestein | Our work aims to develop new mass spectrometry based methods to understand the chemistry of microbes, our microbiome and their ecological niche. In short, we develop tools that translate the chemical language between cells. This research requires the understanding of (microbial) genomics, proteomics, imaging mass spectrometry, genome mining, enzymology, small molecules structure elucidation, bioactivity screening, antibiotic resistance and an understanding of small molecule structure elucidation methods. The collaborative mass spectrometry innovation center that he directs is well equipped and now has twelve mass spectrometers that are used in the studies to investigate capture cellular chatter (e.g. metabolic exchange), metabolomics, and metabolism and to develop methods to characterize natural products. These tools are used to defining the spatial distribution of natural products in 2D, 3D and in some cases real-time. Areas of recent research directions are capturing mass spectrometry knowledge to understand the microbiome, noninvasive drug metabolism monitoring, informatics of metabolomics, microbe-microbe, microbe-immune cells, microbe-host, stem cell-cancer cell interactions and diseased vs. non-disease model organisms and the development of strategies for mass spectrometry based genome mining and to detect and structurally characterize metabolites through crowd source annotation of molecular information on the Global Natural Products Social Molecular Networking at http://gnps.ucsd.edu through the NIH supported center for computational mass spectrometry that is co-developed with Nuno Bandeira. A more detailed biography can be found in this Nature article http://www.nature.com/news/the-man-who-can-map-the-chemicals-all-over-your-body-1.20035 |

| Dr. Sylvia Evans | Dr. Evans’ research focuses on defining genetic pathways underlying heart development and to apply that understanding to both congenital and adult heart disease. A basic understanding of heart development is key toward understanding congenital heart disease and will inform potential cell-based therapies to repair diseased hearts. Building a functioning heart requires the specification and interaction of a number of cell lineages of distinct function. The Evans lab is trying to understand the stepwise process by which mesodermal precursors become committed to cardiac progenitors, and then specified to become distinct cardiac lineages. Dr. Evan’s lab has created a number of Cre-expressing mouse models to examine gene pathways required for specific cardiac lineages, including that of the proepicardial organ, cells that constitute the vasculature, and cardiac fibroblasts. |
Research in the Ferguson laboratory applies chemical synthesis, biochemistry, mass spectrometry and cell biology towards the goal of developing new therapeutic strategies in cancer and neurodegenerative disorders. Our research seeks to enable dissection of the cellular signaling networks underlying disease through development of selective tool compounds that act via inhibition, targeted degradation, proximity mediated-pharmacology, or alterations of posttranslational modifications. We cultivate a multidisciplinary and highly collaborative approach to science to tackle fundamental questions in disease biology and drug discovery.

Dr. William Gerwick

Dr. Gerwick's research focuses on exploring the unique natural products of marine algae and cyanobacteria for useful biomedical properties. These chemically prolific organisms are sources of numerous highly unusual metabolites, and the Gerwick group has been involved in their discovery and evaluation in the areas of cancer, inflammation, infectious disease including tropical diseases such as malaria, Chagas’ disease, leishmaniasis, neurochemical pathways, antiviral activity to SARS-COV-2 as well as agricultural uses. The Gerwick group has also examined the pathways of biosynthesis of many of the compounds they have discovered over the years, and pioneered the characterization of their origins at the molecular genetic and genomic levels.

Dr. Gerwick's group uses SCUBA to collect marine samples from around the world, such as Panama, Madagascar, Papua New Guinea and Guam, and then grows many of these life forms in the laboratory in La Jolla. Extracts of these organisms are tested for bioactivity, and the active compounds are isolated and structures defined using nuclear magnetic resonance (NMR) and mass spectrometry (MS). In the course of this work, a number of new methods of structure analysis have been developed, such as the Deep Learning of NMR spectra called Small Molecule Accurate Recognition Technology (SMART), https://smart.ucsd.edu/classic. Highly interesting metabolites are developed through collaboration with academic and industrial researchers. We are now pursuing several of our lead molecules using synthetic medicinal chemistry and molecular modeling to produce even more active and selective analogs, especially in the area of malaria and other parasitic disease organisms.

Dr. Michael K. Gilson

Computer simulations of the molecules of life are powerful tools for the design of new medications for a wide range of diseases. My lab accelerates drug discovery by improving the realism, speed, and accuracy of these fundamental simulations through methods development and software development and sharing. We also run BindingDB, an open database of measured protein-small molecule binding data over 2 million data for over 1 million compounds, and we are actively engaged in molecular design and synthesis for drug discovery projects relating to cancer and anesthesia.

Dr. David Gonzalez

My laboratory aims to study the biochemistry that governs host-microbe interactions. From a systems scale to single target approach, we focus on studying bacterial pathogenesis, host responses to infection, and the impact of the microbiome on health and disease. At its core, the laboratory develops and applies multiplexing quantitative proteomics tools to simultaneously track hundreds to thousands of protein dynamics and associated post-translational modifications in an accurate and high throughput fashion. We then interface microbiology techniques to characterize important factors identified during these interactions. When appropriate, translational studies of therapeutic value are undertaken in tissue culture, murine models, and by the analysis of human biospecimens. This information is then used to design novel strategies for the detection or treatment of microbial-driven infectious diseases in humans.

Dr. Gustafsson is interested in understanding the molecular pathways that regulate the life and death of cardiac myocytes. The occurrence of cardiovascular disease increases with advancing age and intrinsic alterations in aging cardiac myocytes are a major contributor to the underlying pathogenesis. In particular, a decline in mitochondrial function is considered to play a key role in the increased susceptibility to disease. In the heart, the primary function of mitochondria is to meet the high-energy demand of the beating myocytes by providing ATP through oxidative phosphorylation. Mitochondrial
| **Dr. Asa Gustafsson** | Dysfunction and activation of cell death pathways are common occurrences in cardiovascular disease and contributes to the development of heart failure. Dr. Gustafsson uses genetic, cell and molecular biology approaches, mouse models, and cutting-edge 2D/3D imaging techniques to study the signaling pathways involved in regulating mitochondrial structure, function, and turnover in cells and heart. Specifically, Dr. Gustafsson's research is examining how the E3 ubiquitin ligase Parkin regulates removal of dysfunctional mitochondria in cells; and b) determining the molecular mechanisms by which BCL-2 family proteins regulate mitochondrial function, morphology and turnover in cells. |
| **Dr. Tracy Handel** | Dr. Handel's laboratory takes a multidisciplinary approach including cell and molecular biology, biochemistry, biophysics and structural biology to study the structure and function of chemokines and chemokine receptors. These proteins control the migration of cells during development, immune surveillance, and inflammation. However, inappropriate regulation of chemokines/receptors is also associated with numerous diseases including inflammatory diseases, atherosclerosis, cancer, and HIV. A major area of study includes determining the structure of chemokine receptors in complex with their natural protein ligands (e.g. Qin et al. Science, 2015) and small molecule antagonists (e.g. Zheng et al. Nature, 2016). This work is challenging because chemokine receptors are membrane-embedded G protein-coupled receptors (GPCRs) which are difficult to express, purify and crystallize. GPCRs in general and chemokine receptors in particular are important therapeutic targets and this work should contribute significantly to drug discovery. In fact, the work by Zheng et al. will form the basis for a new drug discovery initiative targeting the chemokine receptor, CCR2. The laboratory also studies the structural and dynamic basis for receptor activation (e.g. Wescott et al., PNAS, 2016), again to facilitate drug discovery. |
| **Dr. Vivian Hook** | The focus of research in the Hook Laboratory is to identify peptide and protease neurochemical mechanisms as new drug target strategies for brain disorders of Alzheimer’s and Huntington’s neurodegenerative diseases, traumatic brain injury (TBI), chronic pain, and mental health conditions of schizophrenia. The neurochemical drug target strategies involve neurotransmitter profiling analyses by peptidomics and metabolomics mass spectrometry combined with proteomics, chemical biology of protease targets, genetics, via human brain focused investigations. Drug discovery combines evaluation of marine natural products with analyses of clinical drug molecules. This research addresses the unmet need for new therapeutic drugs to treat brain disorders. |
| **Dr. Jair Lage de Siquiera Neto** | Dr. Siqueira-Neto’s has 15 years of international experience in discovering and developing therapies for infectious diseases, including SARS-CoV-2, causing agent of COVID-19. His participation in discoveries have brought drug candidates to pre-clinical (Pyronaridine for Chagas Disease) and clinical stages (SLV213, aka K777, for COVID-19) of development. The Siqueira-Neto Lab is focused on the validation of screening assays enabling interrogation of large libraries of small molecules and natural products for the identification of hits with relevant biological activity to treat human diseases, especially but not limited to infectious diseases. The lab also investigates the interaction of host and pathogens to further understand disease pathogenesis and to identify new druggable targets. Dr. Siqueira-Neto has recently given talks to the non-scientific public to explain about COVID-19 and the principles of immunization through the vaccine. |
| **Dr. Irina Kufareva** | In health, disease, and therapy, processes that happen to humans span a wide range of scales. On the one hand, the basis for everything is in the miniscule atomic interactions governed by the first principles of physics; consequently, three-dimensional atomic-resolution molecular structure encodes in itself all the answers. However, compared to the entire proteome, structures are still a few, and even for structurally characterized proteins, extracting answers to the questions of function is nontrivial. On the other hand, even at the level of a single cell (let alone a whole organism), the tangled mess of molecular interactions is so complex that it becomes impossible to tackle with purely experimental means. The overarching goal of our lab is to elucidate structural, molecular, and architectural principles of tumor and immune cell responses to stimuli and drugs via computational approaches. GPCRs and G proteins, the two key classes of cell signaling molecules, are the main focus of our work. |
Computational structural biology of GPCRs and G proteins. Conformational plasticity of proteins, or rather the lack of methods for prediction of conformational changes that are relevant for interactions of these proteins with their ligands and effectors, are important barriers in modern computational structural biology. We develop methods for accurate computational prediction of transient interactions of proteins and chemicals with conformationally variable protein interfaces, and apply these approaches to important cellular targets. In the past, in collaboration with the Handel lab and others, we elucidated the structural basis of ligand binding and signaling in chemokine GPCRs CXCR4 and ACKR3 (both playing a central role in progression and metastasis of numerous cancers, PNAS 2014, Science 2015, PNAS 2015, Nat Comms 2017, PLoS Biol 2020, Sci Signal 2020), CCR5 (an HIV co-receptor, Immunology 2017), and CCR2 (a promising target in inflammation, autoimmunity, and immune-oncology, Nature 2016). We also made key contributions to understanding non-receptor activation of heterotrimeric G proteins, and have solved the first structure of a G protein complexed with one such activator (PNAS 2019) in collaboration with the Ghosh and Chang labs.

Computational systems biology of GPCRs. The new direction of network-based modeling and reverse engineering of cell signaling has been initiated in the lab only recently, but has already led to exciting findings about signaling cascades downstream of several chemokine receptors. The modeling process is based on automated system identification that is informed by multiplexed datasets obtained through spatiotemporally resolved interactomics, phosphoproteomics, or Luminex multi-analyte profiling. This work seeks decoding the principles of biological information transfer and processing, and will inform the design of multimodal therapeutic strategies in cancer and inflammatory diseases.

Dr. James McKerrow

Dr. McKerrow leads a consortium of academic and industry scientists dedicated to the discovery and development of new drugs for neglected tropical diseases (NTDs). This consortium, the Center for Discovery and Innovation in Parasitic Diseases, is focused on drug discovery and development through Phase I clinical trials. The Center pioneered the development of high-throughput screening assays for ten neglected diseases, ranging from single-cell protozoa like Trypanosoma brucei and Trypanosoma cruzi, to complex multicellular helminths (worms) like Schistosoma and Brugia. Over 30 companies have shared compound libraries with the Center. The Center includes expertise in structure-based drug design, encompassing both computational approaches and structure-guided medicinal chemistry, and maintains animal models of NTDs for proof of concept studies. Among its accomplishments, the Center discovered and developed a drug for Chagas’ disease through a successful pre-IND meeting with the FDA. The Center has also received Orphan-Drug Designation from the FDA for two drugs targeting NTDs in a “repurposing” screening campaign. Finally, an anti-parasitic drug was repurposed to successfully treat SARS CoV2 in non-human primates.

Dr. Tadeusz Molinski

Professor Molinski conducts research on the structural, synthetic and biological chemistry of marine natural products from marine sponges (Porifera), ascidians, and environmental bacteria. This includes chemical investigation and methods development for discovery of exceedingly small amounts of rare natural products (‘nano-mole scale’) using NMR, circular dichroism (CD) and mass spectrometry (MS), and synthesis of drug-like analogs for important therapeutic areas.

Therapeutic Areas:
- Cancer chemo-therapeutics
- Antifungal agents
- Kinase and phosphatase inhibitors
- Ca²⁺ channel modulators
- Targeted-enzyme inhibitors for cancer and infectious disease

Dr. Momper’s research focuses on the application of quantitative pharmacology approaches to optimize the development and clinical use of drugs. Current research directions include evaluation of potential therapies for HIV infection in infants and pregnant women and the use of model-based methods to support scientific decision making in drug development. Dr. Momper directs the Translational Pharmacology and Bioanalysis Laboratory concentrated on novel mass spectrometry-based analytical methods, in vitro ADME assays, and pre-clinical and clinical pharmacokinetic studies.
Dr. Jeremiah Momper

Dr. Moore's laboratory is focused on understanding the fundamental mechanisms and pathways involved in how microbes produce antibiotics, anticancer agents, and other bioactive natural products, with a special emphasis on marine microorganisms. Research is performed at the chemistry-biology interface and involves a number of sophisticated approaches that include heterologous biosynthesis, mutasynthesis, chemoenzymatic total synthesis, genome mining, and biocatalysis for the production of biomaterials and other human health products. Biosynthetic systems are largely targeted from marine microbes, which harbor promising natural product compounds such as the potent anticancer agents salinosporamide A and didemnin, the polyketide antibiotics taromycin and marinopyrrole, and the neurotoxins domoic acid and kainic acid.

Microbial biodiversity remains one of the last great biotic frontiers, and developing effective strategies to discover and exploit new small molecules from this resource is integral to the success of future drug discovery efforts. The introduction of recombinant technology to the natural product discovery process has allowed us to interrogate and manipulate biosynthetic processes in order to expand the biosynthetic capabilities of microbes to yield new chemical entities for biological evaluation.

Dr. Bradley Moore

Dr. Victor Nizet

Dr. Nizet's laboratory interests lie in understanding the fundamental mechanisms of bacterial pathogenesis and the innate immune system, with a special focus on invasive and antibiotic-resistant pathogens. Using a variety of molecular genetic approaches, the laboratory discovers and characterizes bacterial virulence factors involved in cytotoxicity, adherence, invasion, inflammation, molecular mimicry and resistance to immunologic clearance. In companion studies, we investigate the contribution of host factors such as antimicrobial peptides, leukocyte surface receptors, signal transduction pathways, and transcription factors in defense against invasive bacterial infection.

We have shown that the basic information gained through this platform can lead to novel treatment strategies for infectious diseases, involving targeted neutralization of bacterial virulence phenotypes and pharmacologic boosting of host innate immune cell function and drug repurposing. Additional studies examine innovative nano therapeutic and vaccine approaches to prevent infection by leading pathogens.

Dr. Anthony O'Donoghue

Our research is focused on the detection and characterization of proteolytic enzymes associated with disease. Many of the proteases that we study are found in infectious organisms, cancerous tissues, immune cells or human biofluids. Following in depth characterization of the target proteases, we develop potent and selective inhibitors to inactivate these enzymes or fluorogenic substrates to monitor catalytic activity.

We use a platform technology called Multiplex Substrate Profiling by Mass Spectrometry (MSP-MS) to uncover the global proteolytic activity in complex biological samples and have successfully applied it to blood, pancreatic cyst fluid, gastric juice of cancer cells and microbes. Our workflow also includes proteomic and peptidomics analysis to identify the proteases and endogenous substrates in the biological sample. Knowledge of which proteases are functionally active in diseased tissue and not active in healthy tissue allow us to 1) develop inhibitors to inactivate the target enzyme, 2) generate protease-activated imaging agents to locate the disease or 3) develop protease-activated drugs to aid in the delivery of toxic compounds to the site of disease. Our group is highly collaborative and we routinely generate substrate specificity profiles of endo proteases, aminopeptidases or carboxypeptidases that have been isolated from diverse life forms such as bacteria, fungi, viruses, plants, protozoa, mammals’ ticks, crustaceans and nematodes.

Dr. Larissa Podust

Structure-based drug discovery targeting pathogens with global health significance: Chagas disease, tuberculosis, river blindness, COVID-19 others; oxidative reactions in antibiotic-producing bacterial systems.
Dr. Zoran Radić, RTAD

Dr. Radić is a graduate of the University of Zagreb in Croatia where he started his research in acetylcholinesterase (AChE) reaction kinetics under mentorship of late Dr. Elsa Reiner, one of founding contributors in the field of cholinesterases. His interests in molecular structure of AChE brought him to UC San Diego where as a post-doc in the Palmer Taylor group he contributed to functional mapping of the AChE molecule using site directed mutagenesis and defined structural domains and amino acid residues critical for catalytic activity and ligand interaction. He proposed common, simplified kinetic scheme and equation to describe acetylcholine (Ach) turnover by both AChE and its structurally and functionally close relative butyrylcholinesterase (BChE) that included both substrate inhibition of AChE and substrate activation of BChE, two prominent forms of deviation from Michaelis-Menten kinetics. Dr. Radić developed intrinsic tryptophan fluorescence-based assays for in vitro monitoring of time resolved and equilibrium-based interactions of cholinergic ligands with native nicotinic acetylcholine receptor ligand binding domain surrogates, ACh binding proteins (AChBPs), as well as with AChE and BChE. This assay proved essential in functional characterization of one of tightest known, small molecule femtomolar inhibitors of AChE developed in collaboration with Dr. Barry Sharpless of The Scripps Research Institute in La Jolla (TSRI). Dr. Radić led and leads, as a PI, NIH funded national and international collaborative projects with researchers from TSRI, Oak Ridge National Laboratory (Dr. Andrey Kovalevsky), University of Utah at Salt Lake City (Dr. Donald Blumenthal), The Ohio State University (Dr. Xiaolin Cheng), UC San Diego (Dr. Carlo Ballatore), New York Structural Biology Center (Dr. Jonah Cheung), Institute for Medical Research and Occupational Health in Zagreb, Croatia (Dr. Zrinka Kovarik), University of Hradec Kralovy, Czech Republic (Dr. Kamil Kuča), University Hospital Hradec Kralovy (Dr. Ondrej Soukup and Dr. Jan Korabecny), towards development of novel, improved oxime reactivators of OP-AChE and OP-BChE conjugates, both in vitro and in vivo.

Dr. Dionicio Siegel

Our group uses synthetic organic chemistry to build molecules designed to perform specific chemical and biological tasks. Current projects fall in three categories: optimizing compounds for enhanced pharmacodynamic and pharmacokinetic attributes, probe compound development for elucidating function and regulation, and syntheses of structurally complex natural products that produce desirable phenotypes. All of these molecule building efforts have the conjoined goal of advancing new ideas in synthetic organic chemistry. In addition, through synthesis the creation of new chemical matter arises providing a competitive edge in our projects' translational potential.

Dr. Debbie Spector, RTAD

Dr. Spector's lab has spent over 30 years studying human cytomegalovirus (HCMV), which is the major viral cause of birth defects, a serious problem in immunocompromised individuals, and a risk factor in atherosclerosis. Her research centers on viral pathogenesis and the molecular mechanisms used by HCMV to control its gene expression and subvert the cell's signaling and regulatory pathways. A key discovery was that HCMV modulates the ubiquitin-proteasome pathway by inactivating the anaphase promoting complex, the major E3 ubiquitin ligase in cell cycle regulation. Other areas of research include the role of HCMV in atherosclerosis and the effects of HCMV infection on the neural lineage specification and maturation of stem and progenitor cells. Dr. Spector's group has also developed a novel strategy for vaccines against viruses that persist and establish latency, and has shown their protective efficacy in animal models of cytomegalovirus infection and genital HSV-2 infection. The underlying principle is that herpesviruses persist because natural immunity cannot eliminate the infected cells, and thus vaccination must be more effective in establishing protection than natural infection.

Dr. Raymond Suhandynata

Dr. Suhandynata is currently the Associate Director for the CMCR Reference Laboratory and is developing analytical approaches for measuring cannabinoid potency and contaminants in cannabis products marked for human consumption to support the State of California’s Department of Cannabis Control. He is also the Associate Director of the ComACC clinical chemistry fellowship at UCSD which trains and educates the next generation of leaders in the field of clinical chemistry. He is board certified in clinical chemistry through both the American Board of Clinical Chemistry and the National Registry of Certified Chemists. Dr. Suhandynata’s research is focused on the development and validation of laboratory developed tests (LDTs) in the clinical laboratory, development of mass spectrometry based approaches to detect antibiotic resistant bacteria, identification of novel psychoactive substances, development of new approaches to measure...
| Dr. Palmer Taylor | Dr. Taylor’s studies have employed spectroscopic physical methods, X-ray crystallography, sequence and three-dimensional structural determinations to investigate the principles of molecular recognition. He has worked with nicotinic acetylcholine receptors and acetylcholinesterase since the mid-1970’s with current interests directed to structure and dynamics as they relate to ligand design. For acetylcholinesterase (AChE), reactivating antidotes to organophosphate nerve agent and insecticide exposure are designed to confer oral bioavailability and CNS reactivation capabilities. These studies evolved from collaboration with Barry Sharpless of TSRI using AChE as the first target template for freeze-frame, click chemistry to synthesize in situ selective cholinesterase inhibitors and reactivator antidotes. Collaborative studies with nicotinic receptors also employ click-chemistry in structure-guided drug design. In this case, a soluble surrogate for the extracellular domain of the nicotinic receptor is used as the template for the in situ synthesis of novel nicotinic receptor ligands directed to the α7 subtype. More recently, Taylor has conducted studies into the structure and function of a post-synaptic adhesion protein homologous to AChE, neuroligin, and its pre-synaptic partner, neurexin. Studies employ both crystallographic and solution-based techniques and are directed to macromolecular recognition of ectodomain adhesion molecules. |
| Dr. Dong Wang | Dr. Wang’s research focuses on understanding transcription and epigenetic regulation, chromatin dynamics, DNA damage repair, as well as developing novel anticancer drugs. Dr. Wang’s group takes a multidisciplinary approach, combining structural biology, chemical biology, biochemistry, computational biology, and genetic methods, to study key protein complexes involved in these fundamental processes and pathways. Understanding how cell process these DNA lesions will help us to understand the mechanisms of drug action and resistance and pave the way for rational improvement of novel anticancer drugs. |
| Dr. Elizabeth Winzeler | Dr. Winzeler is an expert in drug development for microbial pathogens. Ongoing projects cover many areas within small molecule drug development and range from target discovery and validation, cheminformatics, chemistry, bioinformatics, assay development, high throughput screening and the genetics and genomics of drug resistance. Much of her work focuses on malaria parasites. She is the director of the Bill and Melinda Gates Foundation-funded Malaria Drug Accelerator (MalDA, https://MalariaDA.org) a consortium of 18 international laboratories, pharmaceutical companies and research groups whose collective work focuses on identifying new targets and early chemical leads for the global malaria drug discovery pipeline. |
### Table II.1. Department of Pharmacy Practice and Sciences

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<td>YIP, WAI CHUN OLIVIA</td>
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**TOTAL** 3,769,600

### Table II.2. Department of Pharmaceutical Sciences

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KUFAREVA, IRINA  PI  NIH/NIAID  5R21AI149369-02  Computationally informed discovery of scavenging-sparing inhibitors of CC chemokine receptor 2  197,448
KUFAREVA, IRINA  PI  NIH/NIAID  5R21AI156662-02  Spatiotemporally resolved architecture of G protein signaling downstream of CXCR4, the driver of lymphocyte migration  197,500
KUFAREVA, IRINA Co-PI or SC PI  NIH  1R01AI141630-03  Modulation of Macrophage Polarization by Heterotrimeric G proteins: Implications of Gastrointestinal Inflammation-192350  14,600
KUFAREVA, IRINA Co-PI or SC PI  California Institute For Biomedical Research  1R21AI166624-01  Discovery of treatment for visceral and cutaneous leishmaniasis  30,329
KUFAREVA, IRINA Co-PI or SC PI  The Texas A&M University System  1R21AI166624-01  SELF-MASKED ALDEHYDE INHIBITORS OF CYSTEINE PROTEASES  12,640
LAGE DE SIQUEIRA NETO, JAIR Co-PI or SC PI  NIH/NIAID  1R01 AI151639-01  Targeting the Genus Leishmania with Small Molecules  301,000
MOMPER, JEREMIAH Co-PI or SC PI  Boston Medical Center Corporation  R01HD096798  Development of a brain penetrating single chain antibody selectively targeting three repeat tau protein as a new treatment for frontotemporal dementia  63,208
MOMPER, JEREMIAH Co-PI or SC PI  3rt Innovations  1R43NS125810-01  Pharmacomicrobiomic and Metabolomic Analyses  486,136
MOMPER, JEREMIAH Co-PI or SC PI  NIH/NICHD  1P50HD106463-01  Targeting the Genus Leishmania with Small Molecules  3,292,660
MOMPER, JEREMIAH Co-PI or SC PI  California Institute For Biomedical Research  1R01 AI151639-01  Targeting the Genus Leishmania with Small Molecules  301,000
MOMPER, JEREMIAH Co-PI or SC PI  3rt Innovations  1R43NS125810-01  Pharmacomicrobiomic and Metabolomic Analyses  486,136
MOMPER, JEREMIAH Co-PI or SC PI  NIH/NIAID  5R01 AI047818-21  Natural Sources and Microbial Transformation of Marine Halogenated Pollutants  125,550
NIZET, VICTOR PI  CARB-X via Cellics Therapeutics  AHA 830983  Biomimetic Macrophage Nanopores: A Broad Spectrum Sepsis Therapeutic  750,000
NIZET, VICTOR PI  NIH/HD  5P50HD106463-02  The impact of ampicillin and breast milk oligosaccharides on the infant microbiome and immune functions  200,737
NIZET, VICTOR PI  NIH/NIAID  5T32AI1007036-42  Combating Antibiotic Resistance Into the Next Generation (CARING)  571,496
NIZET, VICTOR PI  NIH/NIAID  5R01AI145310-03  Surprising Efficacy of Discounted Antibiotics vs. MDR Gram-Negative Pathogens Occurring Through Innate Immune Sensitization  474,000
NIZET, VICTOR Co-PI or SC PI  NIH/HD  5P50HD106463-02  The impact of ampicillin and breast milk oligosaccharides on the infant microbiome and immune functions  200,737
NIZET, VICTOR Co-PI or SC PI  NIH/AID  5R01AI145325-04  C3-Dependent Intracellular Killing in Innate Immunity and Bacterial Pathogenesis  627,952
NIZET, VICTOR Co-PI or SC PI  NIH/HD  5T32HD087978-07  Academic Training in Therapeutic Advancement of Child Health (ATTACH)  153,473
NIZET, VICTOR Co-PI or SC PI  NIH/HD  3P50HD106463-02S1  Optimization of Antibiotics in Mothers and their Breastfed Infants Using Pharmacomicrobiomic and Metabolomic Analyses  1,015,736
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<td>RADIC, ZORAN</td>
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<td>NEUROLOGICAL DISORDERS</td>
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<td>Re-refined uncharged bis-oximes for rapid CNS reactivation of OP-inhibited hAChE.</td>
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<td>Developing a small-molecule inhibitor of the RBM38-eIF4E complex as a cancer therapeutic agent for patients with wild-type p53</td>
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<td>Identification of novel Clic1 inhibitors for the treatment of cancer Institution Molecular Mechanics for DNA Damage Processing by Transcription Machinery</td>
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<td>WANG, DONG</td>
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**TOTAL 29,487,590**
### Appendix III. Faculty Publications from 2018 – 2022

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<th>Name</th>
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<tbody>
<tr>
<td>Atayee, Rabia</td>
<td>Ten Tips Palliative Care Pharmacists Want the Palliative Care Team to Know When Caring for Patients. J Palliat Med. 2018 07; 21(7):1017-1023.</td>
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<td>Awdishu, Linda</td>
<td>Mice overexpressing chromogranin A display hypergranulogenic adrenal glands with attenuated ATP levels contributing to the hypertensive phenotype. J Hypertens. 2018 05; 36(5):1115-1128.</td>
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Awdishu, Linda A Primer on Quality Assurance and Performance Improvement for Interprofessional Chronic Kidney Disease Care: A Path to Joint Commission Certification. Pharmacy (Basel). 2019 Jul 03; 7(3).
Awdishu, Linda Transferring Key Success Factors from Ambulatory Care into the Community Pharmacy in the United States. Pharmacy (Basel). 2021 Jun 23; 9(3).
Best, Brookie Dolutegravir pharmacokinetics in pregnant and postpartum women living with HIV. AIDS. 2018 03 27; 32(6):729-737.
Best, Brookie Marijuana Use by Breastfeeding Mothers and Cannabinoid Concentrations in Breast Milk. Pediatrics. 2018 09; 142(3).
Best, Brookie Elvitegravir/cobicistat pharmacokinetics in pregnant and postpartum women with HIV. AIDS. 2018 11 13; 32(17):2507-2516.


Best, Brookie Sertraline Pharmacokinetics in HIV-Infected and Uninfected Children, Adolescents, and Young Adults. Front Pediatr. 2019; 7:16.


Best, Brookie Pharmacokinetics of tenofovir alafenamide with and without cobicistat in pregnant and postpartum women living with HIV. AIDS. 2021 03 01; 35(3):407-417.

Best, Brookie Pharmacokinetics of darunavir and cobicistat in pregnant and postpartum women with HIV. AIDS. 2021 07 01; 35(8):1191-1199.


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Tsunoda, Shirley  

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Yousif, Zaid  

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**Table III.3. Department of Pharmaceutical Sciences**

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Abagyan, Ruben

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