Center for Applied Biotechnology Studies

Program Review

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Mission and Goals

Mission

The mission of CABS is to provide research, educational, and consulting opportunities and services to the local and state biotechnology/biomedical communities through its applied research programs and workforce-oriented curriculum.

Goals

1. To develop educational programs supporting biocomputing, bioengineering, and biopharmaceutical workforce development.
2. To create an environment where applied research by faculty and students is a primary objective.
3. To foster interactions with the biotechnology/biomedical industry locally, regionally, and statewide.

CABS is in line with the first goal of the 2018-2023 Strategic Plan (Figure 1) by enhancing high-impact practices. This is primarily achieved by encouraging student involvement in research within CABS faculty laboratories. Engaging in research not only enriches the learning experience but also boosts student retention and graduation rates. Notably, a significant number of research participants are from underrepresented minority groups. In line with goal 2 (Figure 1), CABS constitutes a vibrant point of reference where students find plenty of opportunities to learn through research, strengthening the foundation that facilitates their navigation toward graduation and future success.

Additionally, CABS supports the third goal by welcoming new faculty members to participate in its various activities, with some becoming notably active members of CABS.

In alignment with the fourth goal, CABS motivates all faculty to seek federal and state research funding and actively pursues financial support from private companies.

Figure 1. Summary of CSUF Strategy Plan.

Activities

Although some ongoing activities and the initiation of new initiatives were put on hold during the pandemic, CABS continued to function, and one of its most visible events, the CABS*Con* symposium, continued to be held every year (online in 2020 and 2021).

The Advisory Committee identified priority goals in the Strategic Plan that could be achieved in 2018-2023. These goals are: 1) organizing an annual meeting to showcase CABS achievements and foster collaboration among faculty and with industry, 2) establishing a seminar series inviting a speaker per semester, 3) establishing a fund to give seed grants for faculty to generate preliminary results and be competitive in seeking funds from federal agencies. The advisory committee extended the period of the Strategic Plan (included in the appendix) during the pandemic to 2024, when it will be revised.

All the priority goals listed in the previous paragraph were achieved. Notably, they were performed with external funds.

CABS*Con*. CABSCon, an annual one-day symposium, fosters an informal yet intellectually stimulating environment to discuss advancements across various Biotechnology disciplines. This event draws a diverse crowd, from applied mathematicians and engineers to physics, chemistry, biochemistry, and biology experts. It's an ideal venue for networking, featuring speakers from leading Biotech companies and showcasing students' research projects. The symposium encourages vibrant interactions between students, academic researchers, and industry professionals. Attendance of 100 to 120 participants includes students, faculty, government researchers, and corporate representatives. Attendees come from CSU and UC campuses, some even flying in from the Bay Area to join us in Fullerton. CABS*Con* is increasing the visibility of the research that takes place at CSUF.

CABSCon is characterized by a dynamic program featuring keynote speakers, increasing poster presentations, and company exhibits. It's a free event, complete with provided meals. The symposium is funded by the generous support of a growing number of Biotech sponsors, including the successful companies Embi Tec, BioSynthesis, Zymo Research, Gilead, and Illumina.

Since its inception in 2016, CABS*Con* has been consistently successful, resiliently adapting despite the challenges posed by the pandemic. CABS*Con7* and CABS*Con8*, held in December 2022 and 2023, respectively, were particularly special as they marked the return to the in-person format. These gatherings sparked numerous collaborations, and a remarkable feat was the hiring of a CSUF student by Zymo Research. More details about the symposium can be found at the CABS*Con* website.

Seminar series. The CABS-sponsored seminar series is another objective to foster valuable interactions with professionals in the biotechnology/biomedical fields. Seminars are held approximately once each semester when the Biology seminars occur. They are not just for biology students and faculty; we invite members from other departments and colleges to join us. These seminars offer a unique opportunity for attendees to engage with the speaker before the seminar begins, enhancing the learning experience.

Additionally, when possible, a select group of faculty members, chosen for their relevant research interests, accompany the speaker to a dinner to continue discussions and potential collaborations. After the disruption caused by the pandemic, we successfully revived the series in 2023. Going forward, we will broaden the scope of these seminars by including diverse speakers from government agencies and various industry sectors. This expansion aims to enrich the perspectives and knowledge shared, benefiting the CABS community.

The speakers, affiliations, titles of their talks, and dates were:

Dr. Susan Cohen
CSU Los Angeles
A day in the life of a cyanobacterium
October 18, 2023

Dr. Stevan Pecic
CABS CSU Fullerton
Development of multitarget inhibitors for the treatment of chronic pain: design, synthesis, biological evaluation and molecular modeling studies
August 30, 2023

Dr. Olga Razorenova
Chao Family Comprehensive Cancer Center, UCI
Targeting oxidative phosphorylation
May 3, 2023

Seed grants. Our objective of securing sustainable funding sources faced significant challenges, particularly as it competed with our first objective, which also demanded external funding. Our efforts were further hampered by the onset of the pandemic, which caused considerable delays. Amidst this uncertainty and the unknowns about the post-pandemic landscape, the CABS Director proactively sought a grant from the National Cancer Institute and National Institutes of Health (CSUF/UCI-CFCCC Cancer Health Disparities Research Program). This funding approach involves a partnership between two institutions, in our case, with the Chao Family Comprehensive Cancer Center at the University of California, Irvine. The process entails identifying collaborative projects from both institutions, with the best selections, as determined by a faculty committee, receiving seed grants of $100,000 each for 1-2 years. This amount is notably higher than typical seed grants. Grantees are expected to use the outcomes of these projects as a foundation for applying for more extensive federal funding.

It was refreshing that in a situation that seemed to demand postponement of our goals, we pivoted effectively, securing a 4-year grant to fund new projects. This achievement was refreshing in a challenging environment, demonstrating the CABS resilience and adaptability.

Faculty research. CABS faculty were also active in their research projects, seeking external funding and publishing scientific articles, preferably with students as co-authors. CABS faculty published 116 research articles and received over 29,000,000 in grants from external funding agencies. Lists of the grants and article references are attached in the appendix.

Education. Although the development of student internships was not one of the priority goals for this period, besides the seed grant money, the CSUF/UCI-CFCCC Cancer Health Disparities Research Program provides funds for ten summer internships for CSUF students at the Chao Family Comprehensive Cancer Center at the University of California, Irvine. Ten students spent the summer of 2023 training in different areas of cancer research, and ten more will be trained in the summer of 2024.

Organizational Structure and Governance

The governance of CABS became formalized in 2014 with the formation of the Advisory Committee in the previous review round. The Director and members of the Advisory Committee regularly meet in person or online.

Some members of the original Advisory Committee had to be replaced for various reasons. The Advisory Committee's current members are:

- Dr. Chandra Srinivasan, Associate Vice President, Office of Research and Sponsored Programs, CSU East Bay
- Dr. Richard Chan, CEO EmbiTec, San Diego, CA
- Dr. Howard Xu, Director, LA BioSpace, CSU Los Angeles
- Dr. Veronica Jimenez, Co-Director of the U-RISE program, CSU Fullerton
- Dr. Math Cuajungco, Director of the U-RISE program, CSU Fullerton

The appendix includes letters of acceptance from non-CSUF participants to become or continue being committee members.

Resources and Sustainability

CABS has limited funds in a CSUF Philanthropic Foundation account sourced from our sponsors (named previously) and individual donors. These sources have provided sufficient resources to organize the CABS*Con* conference for the past eight years, including the upcoming CABSCon9 in 2024. Another significant funding source has been an NIH grant, which contributed $100,000 in seed grants. The research grants awarded to many CABS members and the funding mentioned above have enabled CABS to support faculty and students effectively. We achieved the goals set in the previous evaluation period and are now focusing on maintaining the flow of funds to continue our current activities and to expand by adding new ones. The Advisory Committee plans to meet in 2024 to identify additional priority goals from those outlined in the Strategic Plan. Possible further goals for the coming years may include the development of internships in biotech companies and organizing workshops to provide information about funding sources and strategies to apply for them successfully.

Highlights and Accomplishments

A summary of the accomplishments of CABS in the evaluation period includes the individual scientific publications and funded research grants by individual members, the organization of the seminar series, the CABS*Con* conferences, the creation of 20 internships at the Chao Family Comprehensive Cancer Center at the University of California, Irvine, and the establishment of two $100,000 seed grants. The list of publications and grants can be found in the appendix.

Planning and Strategic Outlook

The Director and the Advisory Committee members are satisfied with the progress and sustainability of CABS. The strategy of selecting priority goals within those in the Strategic Plan has been successful, and we are looking forward to expanding and adding some more shortly. Achieving the Strategic Plan's goals is especially challenging because CABS does not offer release time to members, who volunteer overload time to sustain CABS. Furthermore, CABS does not have a recurring budget for any activities, which are entirely funded with external funds gathered through the efforts of the Director and Advisory Committee members.

In the next period, we will also expand the number of CABS members to include faculty from other NSM Departments and Colleges like Engineering and Computer Science and Health and Human Development.

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APPENDIX

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I. Publications (116)

1. Adams, M. D., Pasteran, F., TraCuajungco, glia, G. M., Martinez, J., Huang, F., Liu, C., . . . **Ramirez, M. S.** (2020). Distinct Mechanisms of Dissemination of NDM-1 Metallo-beta-Lactamase in Acinetobacter Species in Argentina. *Antimicrob Agents Chemother, 64*(5). doi:10.1128/AAC.00324-20
2. Ahmadi, M., Amiri, S., **Pecic, S.**, Machaj, F., Rosik, J., Los, M. J., . . . Ghavami, S. (2020). Pleiotropic effects of statins: A focus on cancer. *Biochim Biophys Acta Mol Basis Dis, 1866*(12), 165968. doi:10.1016/j.bbadis.2020.165968
3. Ali, S., & **Cuajungco, M.** P. (2020). Protocol for quantifying zinc flux in cultured cells using fluorescent indicators. *STAR Protoc, 1*(2), 100050. doi:10.1016/j.xpro.2020.100050
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II. External funding

CABS Member	Grant Number	Agency	Years	Amount
W. Ahmed	2245406	NSF	2023-2026	$ 24,910
W. Ahmed*	2010018	NSF	2020-2024	$ 364,582
W. Ahmed	2004566	NSF	2020-2024	$ 287,906
C. Brennan	P20CA253251-pilot	NIH	2023	$ 50,000
E. Chen	SC3GM144065	NIH	2021-2024	$ 426,000
A. Cohen	T34-GM008612	NIH	2017-2022	$ 2,280,355
A. Cohen	T34-GM008612S1	NIH	2021-2022	$ 32,827
M. Cuajungco	T34-GM149493**	NIH	2023-2028	$ 1,673,260**
M. Cuajungco	R03-NS123728	NIH	2021-2022	$ 134,020
M. Cuajungco	R15-NS101594	NIH	2017-2023	$ 776,928
M. Cuajungco*	R25-AG069711	NIH	2021-2026	$ 1,462,814
K. Forsgren	1922541	NSF	2019-2024	$ 273,447
K. Forsgren*	2315749	NSF	2023-2026	$ 400,000
K. Forsgren	Contract	OCSD	2021-2023	$ 69,392
V. Jimenez	R15AI122153	NIH	2016-2026	$ 821,389
V. Jimenez*	T34-GM149493**	NIH	2023-2028	$ 1,673,260**
H. Johnson*	R/HCE-39C	Sea Grant	2023-2024	$ 34,999
H. Johnson*	1833247	NSF	2018-2022	$ 172,258
N. Keppetipola	SC3GM132036	NIH	2019-2023	$ 426,000
A. Miyamoto	EDUC2-13647	CIRM	2022-2027	$ 2,883,440
N. Nikolaidis	P20CA253251-pilot	NIH	2021	$ 50,000
N. Nikolaidis	SC3GM121226	NIH	2017-2025	$ 843,300
N. Patel*	R25AG076390	NIH	2022-2027	$ 1,542,890
N. Patel	EDUC2-08382	CIRM	2017-2022	$ 3,045,000
N. Patel	EDUC2-12734	CIRM	2022-2027	$ 3,606,500
M.S. Ramirez	SC3GM125556	NIH	2018-2026	$ 958,500
P. Sharestani	R15-GM147869	NIH	2022-2025	$ 412,683
M. Tolmasky	R15-AI047115	NIH	2000-2025	$ 1,789,101
M. Tolmasky	T37-MD001368	NIH	2005-2023	$ 3,820,546
M. Tolmasky	P20-CA253251	NIH	2021-2025	$ 905,787
TOTAL			$ 29,568,834	

NIH, National Institutes of Health; NSF, National Science Foundation; CIRM, California Institute of Regenerative Medicine; OCSD, Orange County Sanitation District.
*The CABS member is Co-Investigator.
** One of the CABS members is the Principal Investigator, and the other is Co-Investigator.

III. Letters from Advisory Committee Members

CAL STATE EAST BAY

OFFICE OF RESEARCH AND SPONSORED PROGRAMS
25800 Carlos Bee Boulevard, Hayward, California 94542

February 15, 2024

Dear Marcelo,

I am delighted to accept your invitation to continue serving on the **Advisory Committee** of the **Center for Applied Biotechnology Studies (CABS)** at California State University, Fullerton. It is with great enthusiasm that I accept this opportunity to contribute further to the CABS' objectives and to support broadening the goals of your institution.

During my tenure as a professor at CSU Fullerton and subsequently as an Associate Vice-President for Research and Sponsored Programs at California State University, East Bay, I have been involved in supporting and enriching research, scholarship, and creative activities in all disciplines. My relation to CABS, both as a faculty member and now as a Chief Research Officer, has provided me with unique perspectives and opportunities to further the research in biotechnology.

As I look forward to another term, I am excited to leverage my expertise and network to enhance CABS's research capabilities, promote interdisciplinary collaborations, and expand outreach to industry partners. As a former faculty member of CABS, I am excited to see the progress and the potential for continuing achievements in the future. Working together, we can further solidify CABS's position as a leading entity in biotechnology research and education, contributing to meaningful advancements and solutions to our society's challenges.

Thank you for including me and I am looking forward to another productive term serving the CABS at CSU Fullerton.

Sincerely,

Chandra Khan, Ph.D.
Associate Vice President, Research & Sponsored Programs

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Marcelo Tolmasky, PhD
Director,
Center for Applied Biotechnology Studies (CABS)
California State University, Fullerton
800 N State College Boulevard
Fullerton, CA 92831

Dear Marcelo,

I am delighted to accept the invitation to join the Center for Applied Biotechnology Studies (CABS) Advisory Committee at California State University, Fullerton. This role represents a remarkable opportunity to contribute to the field I am deeply passionate about and a continuation of the longstanding and fruitful relationship between CABS and Embi Tec.

As Embi Tec's CEO, I have closely worked with members of the CABS community for many years. Our equipment and technologies have supported CABS's research and educational missions, and we have proudly participated in the CABS*Con* Symposium since its inception eight years ago.

I bring to the Advisory Committee a unique perspective that blends business leadership with a commitment to advancing biotechnology research and education. I am particularly enthusiastic about the opportunity to leverage my experience and insights to further CABS's strategic goals. I foresee myself contributing to initiatives that enhance research capabilities, foster innovation, and strengthen industry partnerships, ensuring that CABS continues its biotechnology research mission.

I am eager to collaborate with fellow committee members and the broader CABS community to identify new opportunities for growth and impact. The synergy between our respective fields offers immense potential for advancing our academic and practical objectives.

I look forward to contributing to supporting the mission of CABS, and I am excited about the prospects of our collaboration and the achievements we will realize together.

Best regards,

Richard Chan
CEO, Embi Tec

CAL STATE LA
CALIFORNIA STATE UNIVERSITY, LOS ANGELES

COLLEGE OF NATURAL & SOCIAL SCIENCES
Department of Biological Sciences

February 18, 2024

Marcelo Tolmasky, PhD
Director,
Center for Applied Biotechnology Studies (CABS)
California State University, Fullerton
800 N State College Boulevard
Fullerton, CA 92831

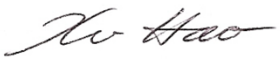
Dear Marcelo,

I am writing to accept the invitation to join the Advisory Committee of the Center for Applied Biotechnology Studies (CABS) at California State University Fullerton. I am happy to be considered for this position, and I am enthusiastic about the opportunity to contribute to the advancement of biotechnology studies alongside distinguished colleagues.

With my current roles as a Professor at the Department of Biological Science, Director of LA BioSpace, and Director of the Post-bac Certificate Program in Biotechnology at California State University Los Angeles, I have dedicated my career to fostering innovation and excellence in the field of biotechnology. My extensive experience in both the academic and industry sectors of biotechnology equips me with a comprehensive understanding of the challenges and opportunities in our field.

I have attended several CABS symposia (CABSCon) over the years, which has given me a deep appreciation for the work being done at the center and the impact it has on the students. These meetings highlighted the critical role CABS plays in fostering collaboration and innovation within our scientific community. I am happy to be able to contribute to CABS's mission of promoting applied biotechnology research and education.

Sincerely,



H. Howard Xu, Ph. D.
Professor of Microbiology
Director, LA BioSpace
Director, Postbac Certificate Program in Biotechnology

5151 State University Drive, Los Angeles, CA 90032-8502 (323) 343-2188 FAX: (323) 343-6451 www.calstatela.edu

IV. Strategic Plan

Center for Applied Biotechnology Studies

Strategic Plan

2018 - 2024

Submitted by:

CABS Advisory Committee

OVERVIEW

About CABS:
The Center for Applied Biotechnology Studies is a university-wide center at California State University, Fullerton created to promote research, educational and consulting opportunities and services to the local and state biotechnology/biomedical communities through applied research projects with emphasis on the field of Molecular Therapies.

Goals:
The CABS goals are to:

1. To develop educational programs that will support workforce development in biomedical and biotechnology industries.
2. To create an environment where applied research by faculty and students is a primary objective.
3. To foster interactions with biotechnology/biomedical industry locally, regionally, and statewide.

Faculty Members:
Members have either Full or Associate membership status depending on how close their research interests are to the field of Molecular Therapies.

- Total Faculty: 17
- Colleges Represented: 1
- Departments Represented: 2

GOALS 2015-2018 (Extended to 2024)

1. To develop educational programs that will support workforce development in the biomedical and biotechnology industries.

Objective: To promote opportunities for undergraduate and graduate students to perform projects on applied research.

Strategies:

i. Offer between one and three applied research projects to research students within the 3-year period.
ii. Obtain a partnership with a company to provide internships for CSUF students to train on applied research by the end of this period.
iii. Provide training to visiting students (students enrolled in institutions other than CSUF) to perform applied research at CSUF.
iv. Encourage students, when possible, to present their work at regional, national and international conferences and to publish their work.

2. To create an environment where applied research by faculty and students is a primary objective.

Objective: To promote applied research among CABS research groups

Strategies:

i. Incentivize submission of grant proposals on applied research.
ii. To have at least two research grant proposals submitted to an external funder by the end of this period.
iii. Establish a minigrant system as seed money to start applied research projects and promote submission of grant proposals to external granting agencies.
iv. Establish an annual meeting to showcase CABS achievements and foster discussion.
v. To identify and secure space for the Prep Room as well as other CABS activities such as location of common equipment or performance of experiments by visiting students or scientists.
vi. To obtain funding for a technician that will be in charge of the Prep Room.

3. To foster interactions with the biotechnology/biomedical industry locally, regionally, and statewide.

Objective: To create a network between CABS and biotechnology/biomedical companies

Strategies:

i. Invite potential industrial partners to give seminars and discuss establishing research collaborations and accepting interns from CABS.
ii. Attend appropriate scientific conferences to increase contacts of members with companies.