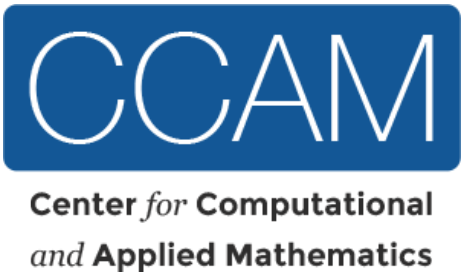

Center for Computational and Applied Mathematics (CCAM)

Director: Sam Behseta, Professor of Mathematics
Associate Director: Laura Smith, Assistant Professor of Mathematics

College: Natural Sciences and Mathematics

Email: ccam@fullerton.edu

Room: MH-531

Established: 2013

Date of Last Review: 11 December 2013

Review Date: 30 April 2018

Mission and Goals

CCAM Mission: CCAM will encourage and facilitate research, education, and outreach in computational mathematics and science through a trans-disciplinary collaboration of a diverse group of faculty, students, and external partners.

CCAM Goal 1: Further promote the culture of computation in the college.
CCAM Goal 2: Promote and provide interdisciplinary research opportunities for faculty members and students.
CCAM Goal 3: Actively seek external funding.

CCAM's mission and goals align with all four of the university's strategic plan goals. CCAM will enhance the work force readiness of involved students (university goal 1), offer students a high-impact practice through funded research opportunities that promote student persistence (university goal 2), and increase recruitment and retention of computationally minded CSUF professors (university goal 3). In addition, CCAM will increase entrepreneurial activity by stimulating the submission of proposals to external funding agencies, allow for-profit workshops to be conducted perhaps on the Irvine campus, and generate revenue by allowing regional users to use the machine's computing power for a fee (university goal 4).

Activities

Goal 1: Further promote the culture of computation in the college.

1. Five extensive workshops have been organized, promoted and held, two for R and three for Python programming. Three of these workshops were instructed by guest speakers from UC Irvine.
2. Nearly 100 people participated in the 6 April Python programming workshop which was held at Mihaylo College of Business and Economics.
3. CCAM initiated a Committee on Computation whose members represent four of the five departments in NSM. Policies are being developed. Quotas for accounts on the Center's High Performance Machine (HPC) have been implemented.
4. Students and faculty across the campus were invited to participate in the workshops and seminars.
5. The TraNSMission newsletter featured CCAM and its interdisciplinary projects in a feature article.

Goal 2: Promote and provide interdisciplinary research opportunities for faculty members and students.

1. CCAM's Research Committee has been established and met once in the Fall 2017 semester. A productive outcome of that meeting has been the establishment of a series of joint grant writing events with department of Chemistry and Biochemistry. Additionally, members of the Committee have continued exchanging ideas about promoting research in the College.
2. Dr. Hernando Ombao from UC Irvine gave a seminar on the applications of statistical modeling in neuroscience; Dr. Jose Cuminato from the University of Sao Paolo, Brazil made a presentation about their Center for Mathematical Sciences Applied to Industry; and Dr. Katrine Svane from University of Bath, U.K. gave a talk on modeling the properties of

hybrid organic-inorganic materials. Additionally, Drs. Michael Groves, Andrew Petit, Allyson Fry-Petit from the Department of Chemistry, Ahmed Wiley from the Department of Physics, Marcelo Tolmasky from the Department of Biology, Sam Behseta, Valerie Poynor, and Derdei Bichara from the Department of Mathematics gave CCAM seminars. Finally, CCAM is sponsoring a grant writing workshop which is held every Friday in our center space, MH 531.

3. CCAM shares office space with the Catalyst Center in MH 531. Four computers are set up for member use. Installation of software is complete. Students are currently utilizing the office and equipment on a weekly basis, about 4 hours per week.
4. Mr. Emerio Martinez was hired to oversee and maintain the high performance computers that CCAM utilizes.

Goal 3: Actively seek external funding.

1. An NSF grant was submitted to the program solicitation NSF 13-542, "Research Experiences for Undergraduates (REU)". It was not funded, but helpful feedback was provided and we anticipate resubmitting in August 2018.
2. The research committee met to discuss ways to generate funding. CCAM met with UEE to discuss potential ways to initiate self-support programs.
3. One fee-based workshop on R was done on Saturday, December 2nd 2017, at the Irvine campus. The registration fee was $75 and 10 individuals attended the event. This event was a coordinated effort with the University Extended Education. Despite the relatively low registration attendance, mainly due to fairly limited public announcements, it provided the Center with an opportunity to examine the logistics and procedures involved with establishing revenue generating activities.

Organizational Structure and Governance

CCAM is led by a Director and Associate Director. It includes two committees and an external advisory board. An IT staff member is assigned to CCAM and has a permanent office in MH.

The Computation Committee meets 4-5 times per year and consists of seven faculty members from all five NSM departments. This committee makes collective decisions about the policies associated with computing in the college. For example, the committee puts caps on the storage and establishes computational quotas on the high performance machine's CPU for faculty and students

The Research Committee meets 1-2 times per year and consists of six faculty members from X of NSM's five departments. The research committee advises the Director and Associate Director on how CCAM can best achieve its annual goals. This committee currently does not have any oversight duties.

There is an external Advisory Board consisting of eight members. Seven members are from industry and one is a retired CCAM director. The Advisory Board has been formed but the

initial meeting has not yet been held. The Advisory Board does not have any oversight duties but was formed to provide guidance to the Center and strengthen ties with industry. Broadly, these include providing feedback regarding the Center's vision, activities and future in relation to industry; creating internship opportunities for students; promoting research oriented interactions among the members of the college and industrial groups; as well as facilitating fundraising efforts.

Resources and Sustainability

The Center has been financially supported by the College of Natural Sciences and Mathematics. The Dean's Office committed to providing $15,000 and six WTUs release time per year for three years. The Center has not yet generated external funding but is committed to developing a fiscally sustainable business plan. Efforts in this direction are summarized under goal three above. To this date, CCAM has gone through one full budgetary cycle. The table below, shows the details of the Center's budget in 2016-17.

Category	2016-17
Student Asst	$ 269.00
Food	$ 1,032.93
Supplies	$ 359.44
Equipment	$ 9,070.69
Honorariums	$ 1,159.43
Travel	$ 1,576.30
Total	$13,467.79

Faculty and Staff affiliated with the center

Director with 3 units release time per semester: Sam Behseta

All other members have no release time:

- Laura Smith (Associate Director)
- Sean Walker (Biology)
- Paula Hudson (Chemistry and Biochemistry)
- Ryan Walter (Biology)
- Wylie Ahmed (Physics)
- Derdei Bichara (Mathematics)
- Nicholas Brubaker (Mathematics)
- Math Cuajungco (Biology)
- Allyson Fry-Petit (Chemistry and Biochemistry)
- Fu-Ming Tao (Chemistry and Biochemistry)
- Michael Groves (Chemistry and Biochemistry)

- Jessica Jaynes (Mathematics)
- Kevin Nichols (Mathematics)
- Thomas Murphy (Mathematics)
- Veronica Jimenez Ortiz (Biology)
- Christopher Lyons (Mathematics)
- Andrew Petit (Chemistry and Biochemistry)
- Valerie Poynor (Mathematics)
- Reza Ramezan (Mathematics)
- Matthew Rathbun (Mathematics)
- Parvin Shahrestani (Biology)
- Anael Verdugo (Mathematics)
- Marcelo Tolmasky (Biology)

Space

CCAM jointly occupies MH-531 with the CATALYST center. This space is assigned by the NSM dean. It also occupies space in the basement of Pollak library for the storage of the High Performance Computing equipment by university IT.

Degree of Sustainability

The support provided by the Dean's Office is intended to allow time for CCAM to develop its vision, attract members, and plan how to resource its needs. As CCAM continues to grow, it will likely need dedicated (not shared) space and additional computational resources. The center has plans to continue fee-based workshops and to develop a CCAM Statistical Consulting Group that would bring in revenue.

Highlights and Accomplishments

- The center has put on six workshops and twelve seminars in the last two academic years.
- There have been multiple collaborations developed across disciplines. In particular, a collaboration with mathematics undergraduate Cameron Hooper, chemistry associate professor Paula Hudson, and mathematics assistant professor Laura Smith has resulted in the project, "Mathematical Modeling of Spectra of Short Chain C2-C6 Dicarboxylic Acids in the Infrared Region using Linear Combinations and the Fast Fourier Transform." The student won an award for his presentation at the largest annual mathematical conference, the Joint Mathematics Meetings, in January 2018. This work was also featured in *TraNSMission* (the college's newsletter), the university's *Daily Titan* newspaper, and the O.C. Register. A second collaboration with undergraduate computer science student Lovell Willmore, physics assistant professor Wylie Ahmed, and mathematics assistant professor Nicholas Brubaker involves modeling a system of particles to understand behavior in the field of active matter. This project has also resulted in many presentations and a publication in CSUF's *Dimensions*. The work was featured in *TraNSMission* as well.
- A High Performance Computing Cluster has been built for the center, and it is nearly always in use.

All of these accomplishments have helped to develop a culture within the college of NSM for computation and interdisciplinary collaborations. So far, 25 faculty have used the computational resources of the Center, and 41 students have been actively engaged in the associated projects.

Planning and Strategic Outlook

CCAM's strategic planning process involves input from both the research committee and the computation committee, as well as the director and associate director of the Center as well as its advisory board.

The center's coming three-year period's goals remain unchanged:

1. Further promote the culture of computation in the college.
2. Promote and provide more interdisciplinary research opportunities for the faculty and students.
3. Actively seek external funding.

The center's resources are presently aligned with these goals.