University of Colorado Boulder

2019 Program Review

Institute of Cognitive Science

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ICS

Program Review

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The Academic Review and Planning Advisory Committee

(ARPAC) review of the Institute of Cognitive Science (ICS) was

conducted in accordance with the 2019 program review

guidelines. Self -study responses were prepared by the unit and

checked by an internal review committee composed of two CU

Boulder faculty members outside of the unit. The internal

reviewers submitted a summary of findings derived from the

self-

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The campus’ standardized description of ICS is available on the

website of the Office of Data Analytics (ODA). ODA updates the

profile annually in the fall semester. This report cites d ata

posted in October 2018, reflecting the state of the Institute of

Cognitive Science as of the academic year (AY) 2017-2018.

The Institute of Cognitive Science (ICS) has been part of the CU

Boulder campus for more than 50 years with a mission that has

remained focused yet dynamic, adjusting and expanding over

time to continually explore relevant questions in cognitive

science. As reported on the ICS website, the institute’s mission

is to “understand and enhance human cognition, learning, and

development through the creation of interdisciplinary

partnerships.” Partners include the departments of Linguistics,

Psychology and Neuroscience, Computer Science, Philosophy,

and the School of Education, among others. ICS thrives as a

multidisciplinary center with connections to more than 240

affiliated faculty and staff members and students. The external

reviewers praised ICS as a highly supportive context for

collaboration across traditional department lines as reflected in

the variety of multidisciplinary projects currently funded, the

highly successful interdisciplinary graduate program, and

excellent administrative staff.

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array of sources including school districts, industry, not-for-

profit companies and foundations.

Research is currently focused in three areas: learning and

education; brain health and wellness, and cognitive

development. The self-study report emphasizes a shift towards

using “data-intensive research methods involving large

quantities of data and/or multimodal data (b rain, physiology,

speech/text, performance), which provides rich opportunities

for us to build on and expand our capacity in machine learning,

natural language processing, and other computational

methods.”

ICS-affiliated faculty members and students conduct research

as part of four institute-hosted centers:

• The Intermountain Neuroimaging Consortium (INC)

• The Center for Research and Education Addressing

Cannabis and Health (CU REACH)

• The Center for Research on Training

• Inquiry Hub: A Research + Practice Partnership with Denver

Public Schools

The institute is committed to engaging in ‘translational’ research

and research + practice partnerships that inform the creation of

innovative interventions, practices, and programs in schools,

companies and communities.

According to ODA, the average per year publication rate of ICS-

affiliated faculty members in refereed journals or book chapters

is 30.6 (18/66) and 41.7 in conference presentations (19/66),

bringing ICS into the top 29% of all CU Boulder academic units.

The self-study reports that since the last academic review in

2012, institute faculty and students disseminated research

findings through 417 academic presentations, colloquia,

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keynote talks, and invited presentations (an average of 64

presentations annually). Since 2012, ICS also disseminated its

research to the larger community through 12 popular press

articles and television news stories. The self-study notes that in

addition to faculty publications and presentations, 22 of the

institute’s affiliated professional research assistants, research

associates, and graduate research assistants published an

additional 216 peer-reviewed journal articles, conference

proceedings, book chapters, invited presentations from 2012 to

2018, many as primary authors and presenters. These numbers

are limited to ICS-rostered faculty and researchers and do not

include additional work by affiliated faculty fellows. The self-

study also highlights prominent textbooks and a published

professional development guide authored by an ICS faculty

member; several patents for applied technologies and

intellectual assets; and a number of conferences, events, and

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nine academic units: Psychology and Neuroscience, Computer

Science, Linguistics, Education, Philosophy, Integrative

Physiology, Information Science, and Speech, Hearing and

Language Science (SLHS). As noted earlier, the institute hosts

four research centers: The Intermountain Neuroimaging

Consortium (INC); The Center for Research and Education

Addressing Cannabis and Health (CU REACH); The Center for

Research on Training, and the Inquiry Hub: A Research +

Practice Partnership with Denver Public Schools. ICS offers two

combined PhD programs (a cognitive science combined PhD

and a cognitive neuroscience combined triple PhD), two

graduate certificate programs (a cognitive science graduate

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the Department of Computer Science (5). The self -study also

counts 42 research faculty and visiting scholars along with 46

faculty fellows who are from more than a dozen CU Boulder

departments and centers. The self -study also reports that 57

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The self-study requests additional staff support from the

university in the following areas:

• .5 FTE staff member (university match with ICS) to support

interdisciplinary educational programs that serve students

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Teaching Assistantships to assist faculty who offer cognitive science courses; no graduate fellowships to attract better students.

The external reviewers report that the graduate students they met were enthusiastic about ICS PhD offerings, though they

noted that students said that information about ICS was often

“haphazard” and varied from department to department. Further, the external reviewers recommend that “ICS should be receiving resources to support what is demonstrably a highly successful interdisciplinary graduate program.” Overall, as

measured by a March 2018 ARPAC-administered climate

survey and a follow-up student town hall meeting conducted within ICS, students are generally satisfied with the ICS programs and research opportunities. The students shared constructive suggestions for ICS improvement (see Climate and Culture).

According to the self-study, in FY 2018 ICS managed a rolling

grant budget of $24.7 million, with annual research expenditures averaging $6.2 million per year between 2012 and

2018. The majority of funding is from 55 active awards and

indirect cost recovery associated with those grants. The 2018

budget represented approximately a $200,000 budget decline

since 2012. The self-study indicates that di minished federal funding drove the budget drop as did the departure of a

research active senior faculty member. Overall, ICS has a

robust funding structure that includes a diverse portfolio that has been relatively stable over time. Nearly 80% of funding is from federal agencies, mostly from the National Institutes of Health and the National Science Foundation, about 9% from

not-for-profit companies and foundations, about 10% from

state agencies, school districts and universities, and 5% from industry. As per the ICS bylaws, the associate director manages budget decisions, with the approval of the director. Budgets for

Budget

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Surveys conducted by ARPAC staff in March 2018 and

addressed to ICS faculty, staff and graduate student

appointees portray an institute that has a positive climate with

strong support for the institute director. That said, according to

the self -study report, the surveys also revealed two areas of

potential growth. First, there were a number of respondents

who answered “Don’t Know/Not Applicable” to questions

related to the experiences of women, people of color, LBTQIA

community members, and persons with varied political and

religious beliefs. Second, while overall ICS -employed graduate

students feel respected by most of their peers and by faculty

members, there was a wide range of responses related to how

supported or valued the students feel. Because graduate

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ICS made a concerted effort to address recommendations put

forward by ARPAC following the 2012 review, though

implementation was limited by a lack of collaboration across

departments and the university. Highlights from the 2012 review

include:

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already noted, only one of four requested faculty lines was

provided. Space allocation continues to be a major

challenge both in terms of transportation to and from CINC

and the main CU Boulder campus, the fact that ICS must

rent space for their research programs, research personnel,

and graduate students, and that researchers are spread

across spaces.

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ICS projects a clear and coherent vision for its future as a self-

sustaining driver of innovative interdisciplinary programs in

cognitive science research and education that will further

campus inclusivity, diversity, and equity goals. The institute

proposes to focus on leading the campus in interdisciplinary

research and in inclusive excellence by, in part, reimagining

interdisciplinary educational programs and developing a robust

resource engine to support future growth.

The ICS strategic plan outlines projects that leverage everyday

uses of technology, involve the newly upgraded neuroimaging

facility, and tackle real-world problems through interdisciplinary

partnerships.

The ICS focus on interdisciplinary partnerships is both a

strength and a challenge. The institute’s research and teaching

goals along with its vision for the future relies on university

partnerships that have not always been reciprocated. ICS

should continue efforts, such as via social media, to clearly and

consistently communicate with academic departments about its

programs and research. The self-study notes that enhanced

communication efforts will require additional staff. The external

reviewers support these requests. However, so far, the

institute's request for additional faculty and staff help in support

of enhanced collaborations have gone unmet by university

leadership.

Both the external and internal reviewers note a lack of formal

research faculty mentoring within ICS. ARPAC urges the

institute to extend its mentoring resources to include its many

research associates and research assistants .

Analysis

Research

faculty

Strategic vision

and

planning

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review, university structures and support for ICS educational

programs is lacking. There is not one clear answer, but it seems

critical that conversations, along with a commitment of

resources, take place between ICS and the Graduate School

and/or individual departments. Guidance might be found by

exploring programs at other universities that have established

and successful interdisciplinary graduate studies models.

Over the 50-year tenure of the institute, its researchers have

garnered consistent grant funding, and ICS appears poised to

continue to nurture outside funding to support its research

initiatives. That said, recent faculty departures, and the

upcoming retirement of several senior faculty members might

leave the institute's funding model in a tenuous position. Still,

the self -study is clear that the institute would like to grow and it

knows university support for additional faculty lines will be

required to enable this growth to happe

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The manner in which [indirect cost recovery monies] are split

between ICS and departments; faculty teaching obligations,

and which courses “count” as fulfilling ICS vs. departmental

teaching obligations; whether ICS hires “count” against

departmental faculty counts; and the degree to which ICS

needs and criteria are considered when ICS faculty are

assessed by department in which their tenure is located.

Additionally, ICS might benefit from a more systematic

approach to defining its collaborations with departments in

such matters as program information distribution, coursework,

and graduate student research appointments.

The ICS self-

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the self -study acknowledges this. The external reviewers also

note that students indicated a desire for greater interaction with

ICS community members and that they sometimes expressed

frustration related to finding information about the curriculum.

ARPAC encourages ICS to address these issues purposefully.

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The members of the Academic Review and Planning Advisory

Committee address the following recommendations to the

Institute of Cognitive Sciences and to the offices of responsible

administrators:

1. Initiate conversations with vice chancellor for research and

innovation and the deans of the College of Arts and Sciences

and the College of Engineering and Applied Science to:

a. Clarify ICS’ role in undergraduate education.

b. Clarify how the required courses for the certificate are

paid for and how TAs, administrative support and course

size will be allocated.

c. Generate an agreement with participating departments to

provide equal credit to faculty who teach these c lasses.

d. Increase clear and consistent communication to

departments about ICS course offerings and research

opportunities, including both affiliated departments and

departments that have not historically partnered with

ICS.

2. Collaborate with the vice chancellor for research and

innovation and departments to clarify expectations for

institute-department relations (e.g., outlining faculty teaching

rules, communication about programs, TA allocation),

especially with the psychology and neuroscience and

computer science departments.

3. Design and implement plans for recruiting graduate students

from underrepresented groups in collaboration with faculty

from affiliated departments, RIO and the Colorado Diversity

Initiative (https://www.colorado.edu/initiative/cdi/) that

supports recruiting diverse graduate students in STEM fields.

Target a portion of future funding proposals towards

To the Unit:

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retention and support efforts for underrepresented

populations.

4. Develop and implement a concrete plan to improve diversity

among tenure-track faculty members that lives up to CU

Boulder’s inclusive excellence standards. This should

include, but not be limited to, consulting with the Office of

Diversity, Equity and Community Engagement and

Department of Human Resources’ Diversity and Inclusive

Excellence division.

5. Fill open and approved faculty positions with the assistance

of the Research and Innovation Office.

6. Collaborate with the vice chancellor for research and

innovation and associated departments to make a case to

replace recent faculty vacancies and develop and execute

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11. Complete and submit an inclusive excellence narrative to

the Office of Diversity, Equity and Community Engagement.

12. Make a case with the Research and Innovation Office and

the executive vice provost for academic resource

management for short-term and long-term improvements

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18. Re-examine the current policy for indirect cost returns to

ICS.

19. Re-examine the policy to charge institutes rent for space

that is used for funded research.

20.

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The director of the Institute of Cognitive Science