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UCONN
CONNECTICUT INSTITUTE FOR THE BRAIN AND COGNITIVE SCIENCES

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Connecticut Institute for the Brain and Cognitive Sciences

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Annual Report, Year 6
2020-21

Contents:

EXECUTIVE SUMMARY (and main expenditure):

- 6 **seed grants** awarded, with PIs across 4 departments: $91K
- 4 **IBRAiN fellows** $82K
- 9 **Graduate fellowships** awarded, across 3 departments: $45K
- 9 **Undergraduate fellowships** awarded, across 3 departments: $28K
- 35 **External grant applications** (see Section 5) <u>directly</u> supported by IBACS, totaling $17.8M. $2.8M awarded so far, $13.4M pending. 61% of applying PIs attributed their applications almost entirely to IBACS support.
- **Laboratory and group support** (through direct funding, admin support, or funded GAs)**:** *Brain Imaging Research Center (BIRC); Murine Behavioral Neurogenetics Facility (MBNF); Cognitive Science Shared Electrophysiology labs (CSSERL); Expression, Communication and Origin of Meaning group (ECOM)*
- **Workshop support:** 3 sponsored workshops/meetings/conferences, including IBACS annual Meet & Speak.

2. INSTITUTE MISSION

The mission of the **Connecticut Institute for the Brain and Cognitive Sciences** (CT IBACS) is to serve as both a beacon and incubator for research across the brain and cognitive sciences at UConn and beyond; promoting and supporting the interdisciplinary science of the mind and its realization in biological and artificial systems. It enables new research and educational opportunities for graduate students, postdoctoral researchers, and faculty to extend their intellectual reach beyond traditional disciplinary boundaries, as well as enabling undergraduates to receive laboratory-based training in neuroscientific, behavioral, and theoretical research in the brain and cognitive sciences. It aims to provide the physical, financial, administrative, technical, intellectual, and educational infrastructure to enable UConn's extensive but distributed neuroscience and cognitive science community to realize its full potential for disciplinary and interdisciplinary innovation in the brain and cognitive sciences. The Institute was founded July 1st 2015, as a part of the University's Academic Plan.

3. GOVERNANCE

The Institute is managed by a **Director** (Altmann, *Psych Sciences*) and two **Associate Directors** (Fitch, *Psych Sciences*; Chamberlain, *UConn Health*). They meet with an **Executive Committee** of 10 other faculty drawn from 7 different departments across 4 Schools or Colleges (CLAS, School of Engineering, School of Medicine, NEAG School of Education). The executive meets in person three times per year, although day-to-day issues are brought to their attention, and advice sought, via ad-hoc emails throughout the year. The Director and Associate Directors meet regularly during the semesters, and occasionally during the summer break.

A **UConn-internal Advisory Board** meets twice a year, advising on shorter- and longer-term issues of strategic importance, in respect of both Institute-internal matters and issues that may impact externally on the Institute. Throughout the year we solicit and receive advice from CLAS, the Offices of the Provost and the Vice President for Research, as well as the heads of the various departments we interact with (with particular support from Psychological Sciences).

4. INSTITUTE ACTIVITIES 2020/21

1. **Seed grants**: The Institute had one call for seed grants (October 2020) rather than two due to budgetary constraints. We received 8 applications in total, of which 6 have been funded (approx. $91K). We received more letters of intent than applications, but on 2 occasions we advised against proceeding to a full proposal (the applications did not fit sufficiently well with the Institute's mission). All applications were reviewed by at least three reviewers drawn from the IBACS community. We avoid reviewers who are themselves applicants in the same round, although occasionally we will solicit advice from someone in this position, noting the conflict of interest. Overall, 3 out of 6 applications could be considered "cognitive", although the dollar amounts awarded are more evenly split between cognitive/behavioral and bench or animal neuroscience grants. We continue to monitor this closely. All awards are described on the IBACS website (ibacs.uconn.edu/research/). *A condition of a seed grant award is that, in the event of a successful outcome (e.g. data suitable for publication or inclusion as pilot data in a grant) the PI will submit an application for external funding*. We track and follow-up each funded grant to ensure this condition is met. We note that $10,000 was awarded in start-up funding to a post-doc PI funded by a combination of grants, CLAS, and the OVPR. Another $5,000 was awarded to Dr. Xygalatas for post-COVID recovery funding. **Total amount awarded in AY/FY 20/21: $91,186**. See Appendix 2. Comparative data on seed grant expenditure across Years 1 to 5 of the Institute are shown below. This last year saw fewer grants funded, in part reflecting a need to balance the budget through to

June 2022 (see budgetary sections below), but also reflecting the COVID-19 pandemic that caused many labs that we support to go into lockdown. While many have started up again, they have operated at a considerably slower pace than normal. The pandemic affected AY5 and AY6 in the following graph:
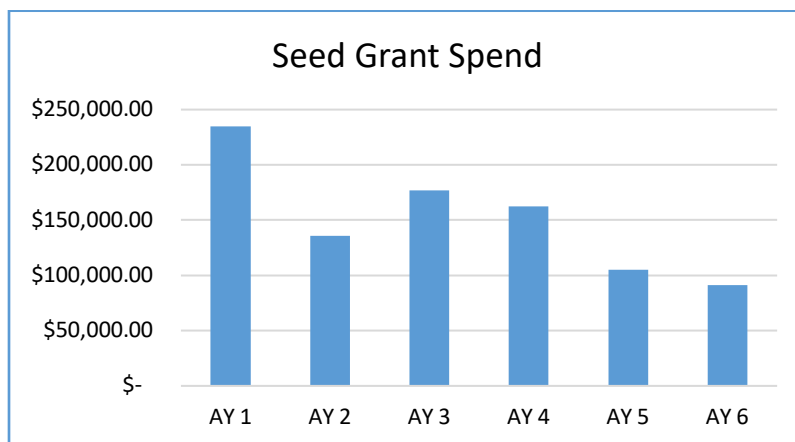
2. **IBRAiN Program**: 2020/21 was the fourth year of this program. This is a Research Assistantship paying four graduate students a stipend for 10 hours' assistance per week in BIRC ("IBRAiN" = "IBACS-BIRC Research Assistantships in Neuroimaging"). IBRAiN students are trained to assist with, and are themselves trained in, advanced specialized knowledge currently lacking in the labs of PI's who have sufficient knowledge to conceive of appropriate imaging studies but do not have the expertise to actually run a study and analyze the data. Each IBRAiN student receives a summer fellowship ($5,000), as well as MRI scan time, to work on their own neuroimaging project. The total cost of the program in FY20/21 was approximately **$81,688**. The recipients of the IBRAiN are listed in Appendix 5, and a summary report is included in Appendix 6. This year saw a reduction from 5 to 4 assistantships, reflecting the needs of BIRC as well as our own budgetary constraints.

3. **Graduate Fellowships**: These pay up to $5,000 in summer funding to graduate students. *A condition of award is that students apply for a pre- or post-doctoral award (e.g. NRSA or GRF) in the Fall*. To this end, recipients take a 3-day grant-writing workshop hosted by the Institute (with various assignments across a 2-month period). This year was the 6th year of the workshop. For non-US citizens, their advisor had to commit to writing an application for external funding. We follow-up on each fellowship both to encourage and monitor such applications (see below for 2018 metrics). This year (Summer 2021), we funded **9 students, at a cost of $45,000.** Each student receives $2K upfront and $3K once the external grant application is in submittable form (to be signed off by the advisor, in principle during the summer, but by no later than March 1st of the following year). Funding decisions were made by a committee comprising of the Director and Associate Directors (COIs were avoided by ensuring that no advisor scored their own student, and conflicts were registered and explicitly considered by non-conflicted members). We follow-up with each student and advisor to monitor progress on applications. See Appendix 3. Again, fewer fellowships were funded this year, reflecting budgetary constraints.

4. **Undergraduate Fellowships**: The undergraduate fellowship scheme ran for a fifth year, managed by Min Tang-Schomer, in conjunction with the Office of Undergraduate Research. The fellowships allow a student to work in an Institute affiliate's lab and provide up to $1,000 research expenses for semester fellowships, and a combination of $1,500 research expenses and $3,500 stipend for summer fellowships. We funded 4 semester and 5 summer fellowships in 2020/21 at a **total cost of $27,611**. See Appendix 4.
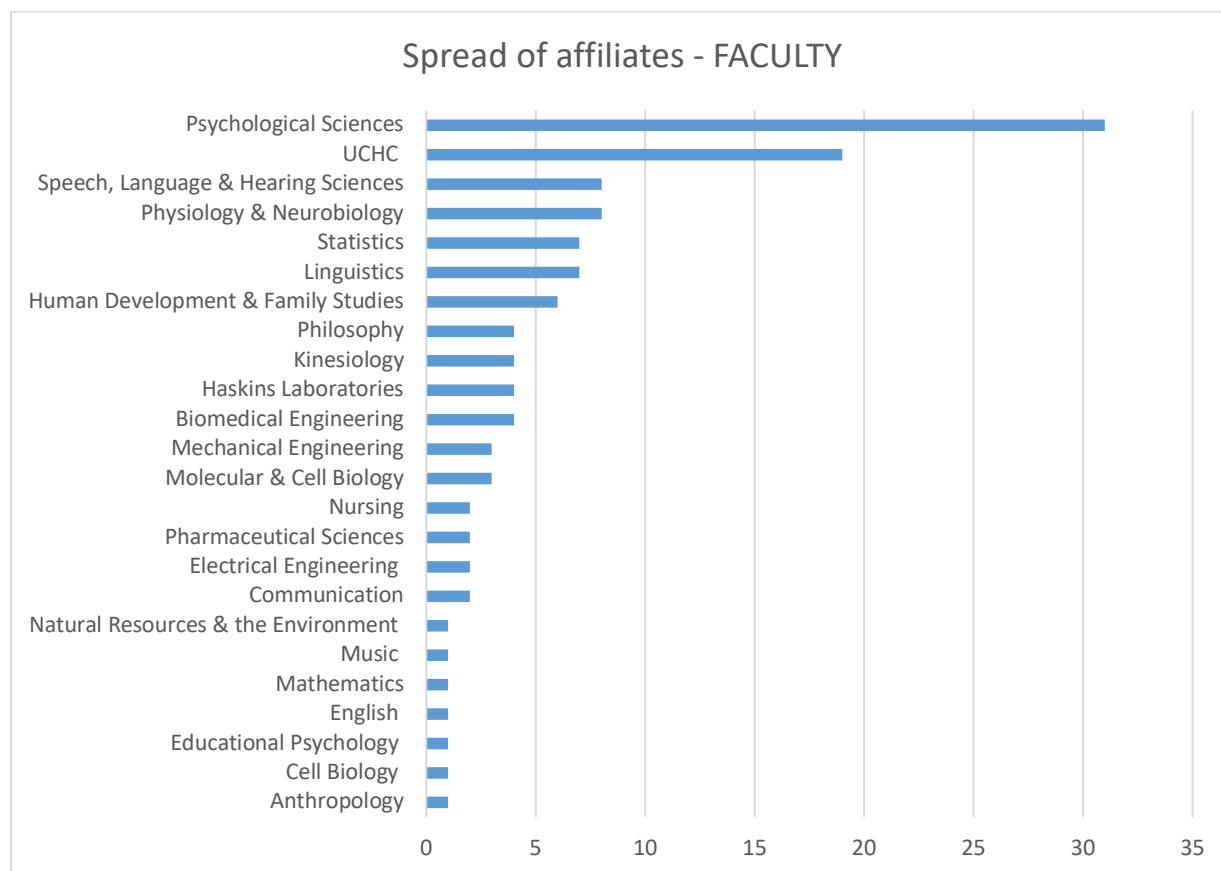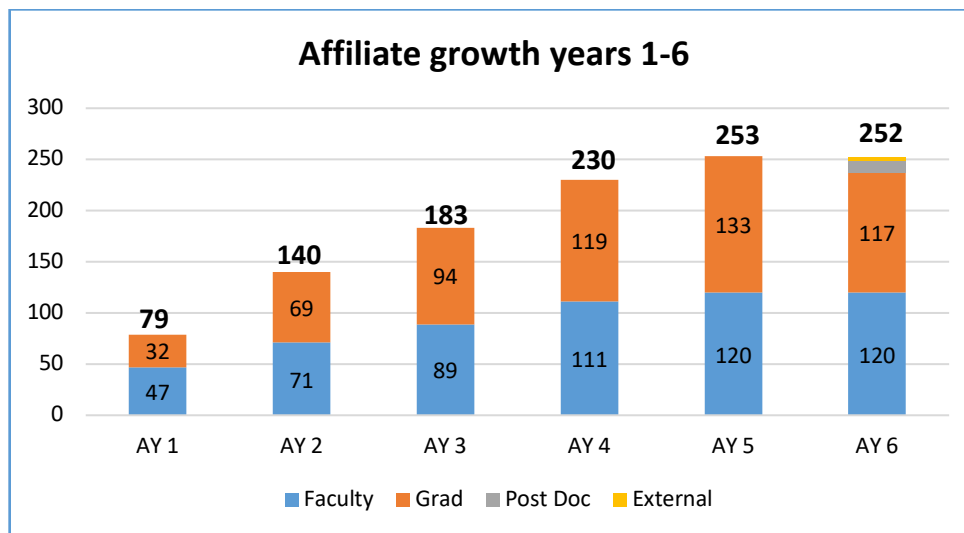
5. **Graduate Opportunity Fellowship**: This fellowship provides a 10-hr graduate assistantship to an IBACS-affiliated student. The GA coordinates among a variety of departments and programs to increase diversity in their colloquia speakers. This (currently annual) fellowship is made available through a generous gift from an anonymous benefactor ($10,000, with IBACS making up the difference to a 10-hr GA: $5,400). The first award was made in early summer (2021), and the fellowship will start in Fall 2021.

6. **Travel Awards**: These award up to 10 $500 fellowships to be used for conference travel expenses where data will be presented that was directly supported by IBACS. These awards will be made available to undergraduate and graduate students, as well as postdocs. We did not make any awards this year due to UConn's COVID-19 travel restrictions and many conferences being held virtually.

7. **Other Research Support during the past year (July 2020 – June 2021):**
   a. **Murine Behavioral Neurogenetics Facility** (MBNF)**:** In June 2018, MBNF became a subsidiary facility under the governance of IBACS. MBNF is managed by the current Director, Dr. Fitch. It was originally a Tier 2 facility funded by the University's Academic Plan. This year, we provided a block grant of $48K to MBNF to support Institute-funded and affiliated research with mouse models (linking cognitive behavior to neuroscience and genetics). A summary report and financial breakdown is included in Appendix 6C.
   b. **Cognitive Science Shared Electrophysiology Labs** (CSSERL): Lab manager (10 GA hours per week during the academic year). CSSERL supports the electrophysiological (EEG) research of faculty in SLHS, Linguistics, and Psychological Sciences. A summary report is included in Appendix 6B.
   c. **Brain Imaging Research Center (BIRC).** Aside from the IBRAiN program, Dr. Gitte Joergensen (the Director's lab manager / postdoc) spends a minimum of 12 hours per week on BIRC-related activities during the year, developing, maintaining, and helping write scripts for the in-scanner eye-tracking system. She also helps with EEG and works closely with Elisa Medeiros (MR Tech) on development and maintenance of other fMRI-based projects. A summary report of the BIRC IBRAiN Program is in Appendix 6A, and Joergensen's BIRC projects are described in Appendix 6E. IBACS also contributed $3,000 to a BIRC equipment request this year.
   d. **IBACS Lab Manager:** Dr. Joergensen is paid 2/3 IBACS 1/3 Yee Lab. Aside from her work in BIRC and managing both the Yee Lab and the Altmann Lab, she also supports a number of non-BIRC collaborative projects under the auspices of IBACS. These are summarized in Appendix 6E.
   e. **Center on Aging, UConn Health.** IBACS and InCHIP together supported a research project on lower urinary tract symptoms (specifically, "bladder urgency") and cognitive modulation of the experience of urgency. This project was a collaboration between IBACS and the Center on Aging and The Institute for Collaboration on Health, Intervention, and Policy (InCHIP). This paid one $10K fellowship ($5K from each Institute) in each of 2017/18 and 2018/19 to a student on the Masters in Public Health. A hypothesis paper has been submitted (authors: Lee[1], Cavallari[2], Kuchel[3], Altmann[4], & Smith[3]; [1] Department of Public Health, Boston University; [2] Department of Public Health Sciences, UConn; [3] Center on Aging, UConn; [4] Institute for the Brain and Cognitive Sciences, UConn). It is currently being revised for one of the *Nature* journals.

8. **Group Support during the past year (July 2020 – June 2021):**
   f. **Expression, Communication, and the Origins of Meaning (ECOM) Research Group** ($3,500). To support organization of the ECOM Spring Workshop and their speaker series. A summary of ECOM activities is included as Appendix 6D. IBACS also awarded ECOM a $7,000 grant for a three-day international interdisciplinary conference titled Expression, Language and Music (ELM) which was supposed to take place in May 2020. Due to COVID-19, it has been
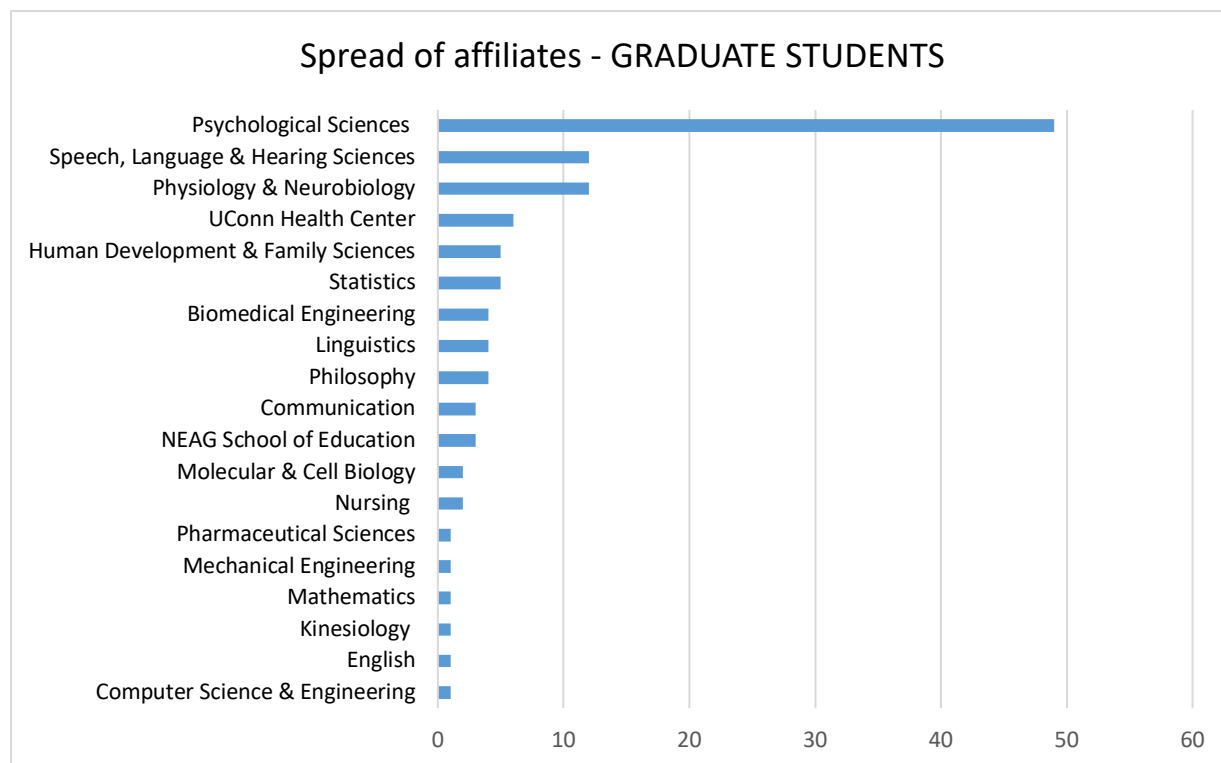
      tentatively postponed to May 2022. See the ECOM report in Appendix 6D for more information on this conference.

    g. **UConn Logic Group**. To support colloquia, visits, and other activities of the Logic Group – a group of logicians across the departments of Mathematics, Philosophy, and Linguistics.

    h. **Cognitive Science Program**. IBACS provides administrative assistance for the program (including managing meetings, the website, etc.). The Institute also provides financial assistance for jointly organized visiting speakers.

    i. **UCONN K.I.D.S**. IBACS supports UCONN K.I.D.S. through continued support for the UConn server.

9. **Workshop and conference support**. The Institute supported 3 workshops/conferences: Language Fest; IBACS Meet & Speak; IBACS Grant Writing Workshop. The Institute typically supports other conferences/meetings also, but due to COVID, they were held online or cancelled so financial support was not requested.

10. **Annual "Meet-and-Speak"**. IBACS holds an annual Meet & Speak event. This year ('21), it was held virtually on October 10th. At this event, faculty talks were presented from both Storrs and UConn Health (predominately recipients of IBACS seed grants), with presentations also from Graduate Students (IBACS Summer Fellows and IBRAiN students). See Appendix 8 for the program.

11. **IBACS External Application Review**. This internal review process continues to be organized by a small interdisciplinary group led by Jim Magnuson, and tasked with helping UConn investigators develop high quality grant proposals by offering a mechanism for "mock review" of in-development proposals, and facilitating mentoring in grant writing.

12. **Administrative support**. Crystal Mills joined us in October of 2018. This position is fully funded by IBACS. This position also provides support to the Cognitive Science program (admin support and website management). As the Institute Coordinator, Crystal ensures that all the activities that have an annual cycle (seed grants, fellowships, Research Digest, etc.) proceed to time, ensures that we know our budgetary situation on a weekly basis, and keeps the website and various databases (including those containing performance metrics) up to date. Crystal also manages our annual Meet-and-Speak, as well as various other activities throughout the year (including the workshops we support). She also provides support to the Director in respect of his other administrative duties within Psychological Sciences. Crystal's oversight of the Institute's finances identified vulnerabilities that we are now better prepared for (see Section 6: Going Forward). Other tasks include continuing development of the Data Collection Portal with UITS (for collecting performance metrics that contribute to Section 5, below), and managing the transition to online activities. Crystal is aided by a work-study undergraduate student. See Section on Outreach for other support activities.

13. **Space**. The Institute's physical focus consists of lab space in Arjona allocated by their respective departments to PIs Altmann, Hancock, Large, Magnuson, Yee (all Psychological Sciences), and Sprouse (Linguistics), and used also for teaching (the SLAC and Neurobiology of Language graduate programs). IBACS has recently purchased a conference webcam to enable distributed meet-ups (i.e. different groups using Zoom or equivalent from different rooms).

14. **Educational Playcare Fellowship**. This fellowship provides up to 20 weeks of free, full-time daycare to IBACS-affiliated students, to be used within the first year of their child's life. It is intended to support students who become new parents during their graduate studies, and to facilitate their return to their studies/research. Two fellowships are available each year. They are made available through a generous gift from Educational Playcare. The first fellowship was awarded in April 2019 and two more were awarded in March of 2020. We did not receive any applications in FY21, which we suspect is due to a combination of parents being at home and some withdrawing from daycare temporarily due to COVID-19. It consists of 10 weeks' free daycare provided by Educational Playcare, and a further 10 weeks of childcare paid for by IBACS (max. annual cost to IBACS: $6,400).

15. **Outreach and related activities**.
    - The Institute is in the process of publishing its fourth **Research Digest** edited by graduate students (Cara Hardy, Ben DeBari). This is similar to a "glossy brochure" and focused on the lifespan and relevance for public policy. Two-hundred hard copies will be sent to a member of the state legislature, and copies will also provided to the UConn KIDS Research Recruitment Coordinator and were also made accessible across the Storrs campus. The Digests are available on the Institute website.
    - The Institute has identified **Advanced Placement Psychology Instructors** at high schools across Connecticut, and has created a listserv in which to share information with them such as the Brain Digest, advertisements of upcoming talks/colloquia, and recorded videos of colloquia of interest.
    - IBACS has coordinated its third **BIRC fieldtrip** with high school students studying Advanced Placement Psychology after a cancellation last year due to COVID-19. Virtual field trips of the Brain Imaging Research Center occurred in early May 2021 with students from E.O. Smith and Windham High Schools. Students were given tours of the MRI, EEG and TDCS facilities, accompanied by a Q&A with BIRC's Associate Director, Roeland Hancock.
    - The Institute uses its website to celebrate the successes of the affiliated research community by placing various "**spotlights**" on the homepage that highlight and describe the activities of select faculty and student (graduate and undergraduate) Fellows.
    - The Institute offers administrative support, through the Institute's coordinator, to an initiative directed by IBACS affiliate Professor Eiling Yee called Mentoring Aspiring Graduate students and building an Inclusive Community (MAGIC). This program supports underrepresented or first-generation students throughout the process of applying to graduate programs. Last year, each mentees was matched with one UConn faculty mentor and one current PhD student mentor in the mentee's interest area. Video chats were then arranged for conversations/advice on topics such as choosing a graduate program, feedback on application materials, how to prepare for graduate school, how to interview, and financing graduate school. The program is currently being integrated into the Husky Mentor Network to increase flexibility, such as allowing mentees to meet with as many matched mentors as desired at any time.

16. **Affiliate membership**. The Institute has a total of 252 affiliates including 120 **faculty,** 117 **graduate students** and 12 **post-docs** from across 34 UConn departments, in addition to 3 external affiliates. All are listed on the Institute website (photograph, research description). Affiliation is dependent on demonstrating research expertise relevant to the research mission of the Institute. Affiliation is a pre-requisite for applying for financial support from IBACS and enables us to track the impact of that support (see Section 5). Affiliates receive a weekly summary of opportunities and announcements. We note that our affiliates typically do not inform us when they leave the University; this year, we've gone through the UConn phonebook, LinkedIn profiles, etc. to follow-

up with anyone we suspect has left UConn. Hence the plateau in number of affiliates in year 6. We plan to continue this exercise annually moving forward.

Affiliate growth years 1-6

	AY 1	AY 2	AY 3	AY 4	AY 5	AY 6
Total	**79**	**140**	**183**	**230**	**253**	**252**
Grad	32	69	94	119	133	117
Faculty	47	71	89	111	120	120

Legend: ■ Faculty ■ Grad ■ Post Doc ■ External

Spread of affiliates - FACULTY

Department	Count
Psychological Sciences	31
UCHC	19
Speech, Language & Hearing Sciences	8
Physiology & Neurobiology	8
Statistics	7
Linguistics	7
Human Development & Family Studies	6
Philosophy	4
Kinesiology	4
Haskins Laboratories	4
Biomedical Engineering	4
Mechanical Engineering	3
Molecular & Cell Biology	3
Nursing	2
Pharmaceutical Sciences	2
Electrical Engineering	2
Communication	2
Natural Resources & the Environment	1
Music	1
Mathematics	1
English	1
Educational Psychology	1
Cell Biology	1
Anthropology	1

Spread of affiliates - GRADUATE STUDENTS

5. METRICS FOR EVALUATING INSTITUTE IMPACT: July 1st 2020 – June 30th 2021

The Institute's impact is twofold: in respect of the research ethos it is stimulating and in respect of more tangible outputs such as grant applications and publications. One of the core missions of the Institute is to foster new collaborative research initiatives, through facilitating dialog across traditional disciplinary boundaries. This is accomplished through activities such as the Meet-and-Speak, as well as through support of research groups that are themselves fostering such cross-disciplinary dialog. Applications for seed grants often involve a dialogue that references other faculty who may have relevant expertise. This contribution of the Institute to the University's research ethos is critical, and a primary motivation for the founding and continued operation of the Institute. However, because it is less quantifiable than the Institute's contribution to grant activity and publication and other outputs, we focus in this section on the latter, detailing metrics concerning grant activity, and publications. In 2019, we rolled out a new web-based portal for affiliates to enter information about the IBACS support they have received or made use of, grant applications submitted, and scholarly products output. The portal was developed in conjunction with Jason Card at ITS. It has been made available to other Institutes and Centers for their own use now that it has been fully debugged and lessons have been learned from last year's trial. *Collecting metrics is imprecise, although we ensured that all faculty/graduate students who received funding responded and entered the requested information. All figures reported below are likely to under-estimate the true figures* (see Section 6). The Institute Director has taken part in a number of discussions on how our experience can help improve metric collection across the university, with several demos to representatives from the Provost's office, the OVPR, and to Deans and other Directors.

Since Inception: Since the Institute was founded in 2015, **it has supported 111 unique faculty** through seed grants, and their graduate and undergraduate students. **The Institute has supported 97 unique graduate and 58 unique undergraduate students** through fellowships. IBACS has spent approximately $696k on student fellowships (e.g. IBRAiN program, Graduate RAs, graduate and undergraduate research fellowships), $947K on seed funding, $911K on group support and $159k on meeting support. These total approximately $2.7 million (approx. $452K per year).

Extramural Grant Activity FY20/21: We solicited from all Institute affiliates details of any grant submitted externally in this reporting period **which had been *directly* supported by IBACS funding** (affiliates were told that *"IBACS support includes: use of EEG/tDCS Lab (BIRC), seed grant funding, support from an IBRAiN Fellow or IBACS Grad/Undergrad Fellow, support from Joergensen lab manager, use of the CSSERL lab or Murine Facility, or use of IBACS External Application Review service (EAR)"*). We do not include in these figures other grants submitted by Institute affiliates which were not directly supported.

- Directly supported grants **applied for**: 35 grants totaling $17.8M (down from 41 last year)[1]
- Directly supported grants **awarded**: 6 grants totaling $2.8M; indirects $620K (up from 3 grants and $324K last year; indirects up from $21K)
- Directly supported grants still **pending**: 20 grants totaling approx. $13.4M; indirects $4.9M (up from 18 grants, down from $13.5M; indirects up from $4.1M)
- **grant hit rate** (# grants awarded as percent of # grants applied for): 17% (up from 7% last year)
- **$ hit rate** ($ amount of grants awarded as percent of $ amount applied for): 16%
- **The bottom line:** ROI is $5.05 for each $1 in University investment.

Note 1: These numbers include 6 extramural graduate student applications, and reflect also the slowdown in research activity due to the COVID-19 pandemic.

Estimating the causal role of IBACS in generating extramural grant activity

During this year's data collection, we asked affiliates, "On a scale of 1-5, 5 being critical (could not have submitted without IBACS support) and 1 being not needed (could and would have submitted without IBACS support), what role did IBACS support play to enable you to submit this grant?" The responses are reflected in the pie chart to the right. 61% of the PIs who submitted grants (N=35) rated IBACS support as critical and without which the grant could not have been submitted. 68% gave a rating of 4 or 5.

IBACS Grant Criticality

4% 7%
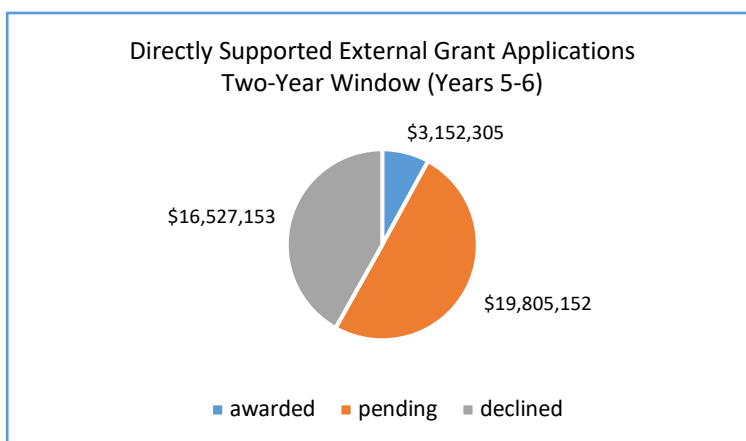7%
61%
21%

■ 1 ■ 2 ■ 4 ■ 3 ■ 5
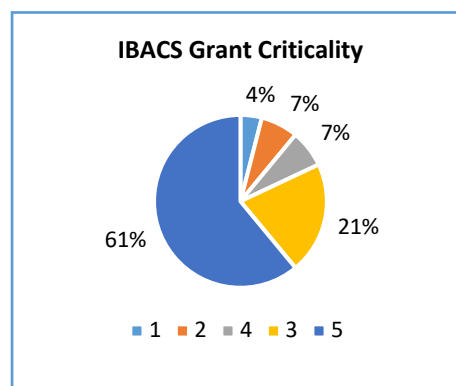
As described in our previous two Annual Reports, we now also report aggregated data across a two-year window (the current year and the previous year). Going forward, this should give a more accurate view of the data that is less prone to yearly ups or downs due to the relatively small numbers involved (it only takes one large grant award, for example, to shift the numbers dramatically).

Two-Year Window – FY20– FY21:

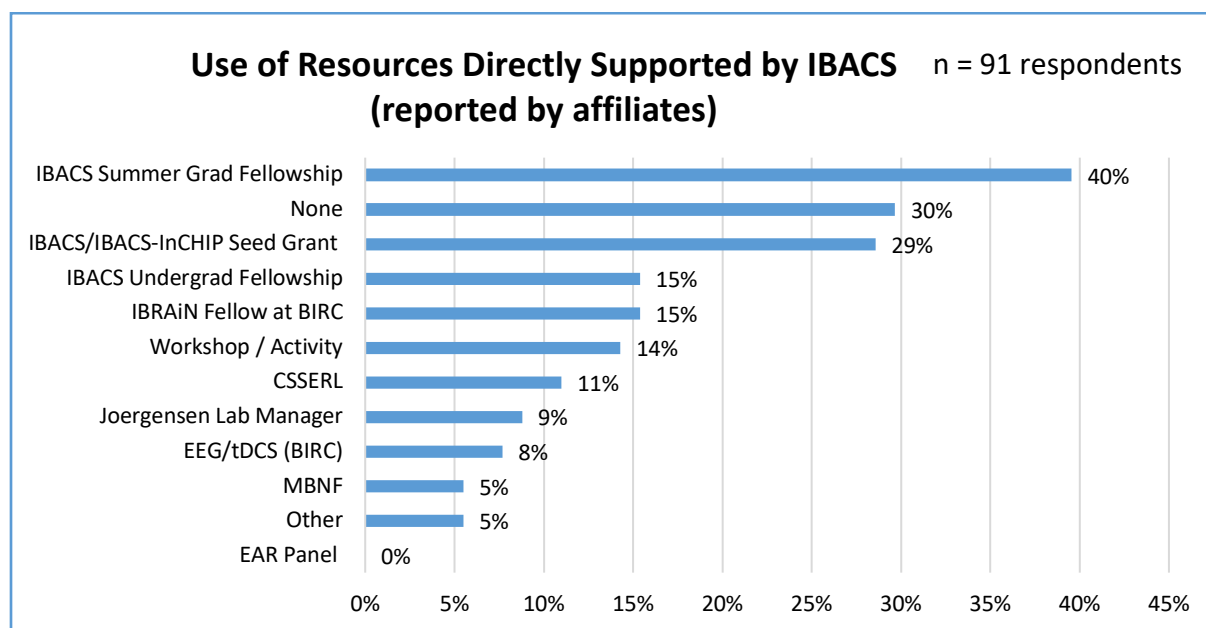Directly supported grants **applied for**: 66 grants totaling $40.5M

- Number of unique lead PIs who applied for grants: 44
- Directly supported grants **awarded**: 9 grants totaling $3.2M; indirects $641K
- Directly supported grants still **pending**: 28 grants totaling approx. $19.8M; indirects $6.6M
- **grant hit rate** (# grants awarded as percent of # grants applied for): 14%
- **$ hit rate** ($ amount of grants awarded as percent of $ amount applied for): 8%
- *The bottom line*: Our averaged ROI is $2.69 for each $1; our 6-year average is $7.05[1]

Note 1: Last year had exceptionally low grant income, and while this year's numbers do look slightly better than last year's, they are still down from our average ROI which typically fluctuates in the $7.00 range. This and last year's figures were adversely affected by the research slowdown due to the COVID-19 pandemic.
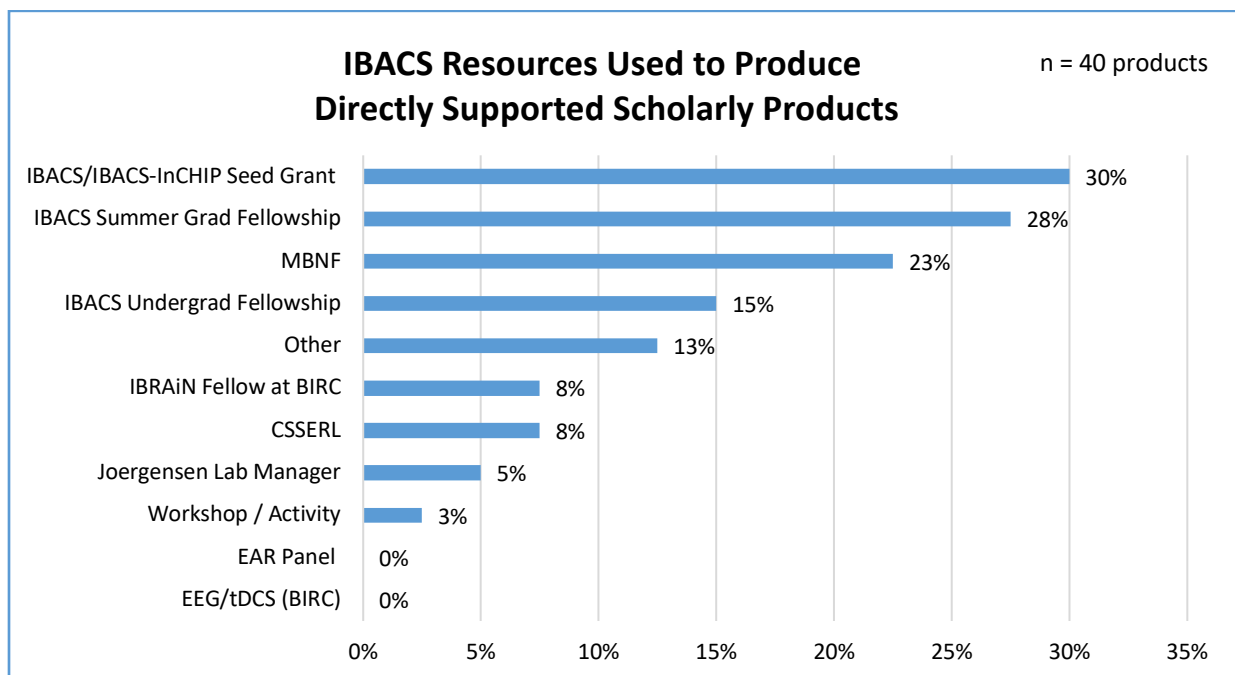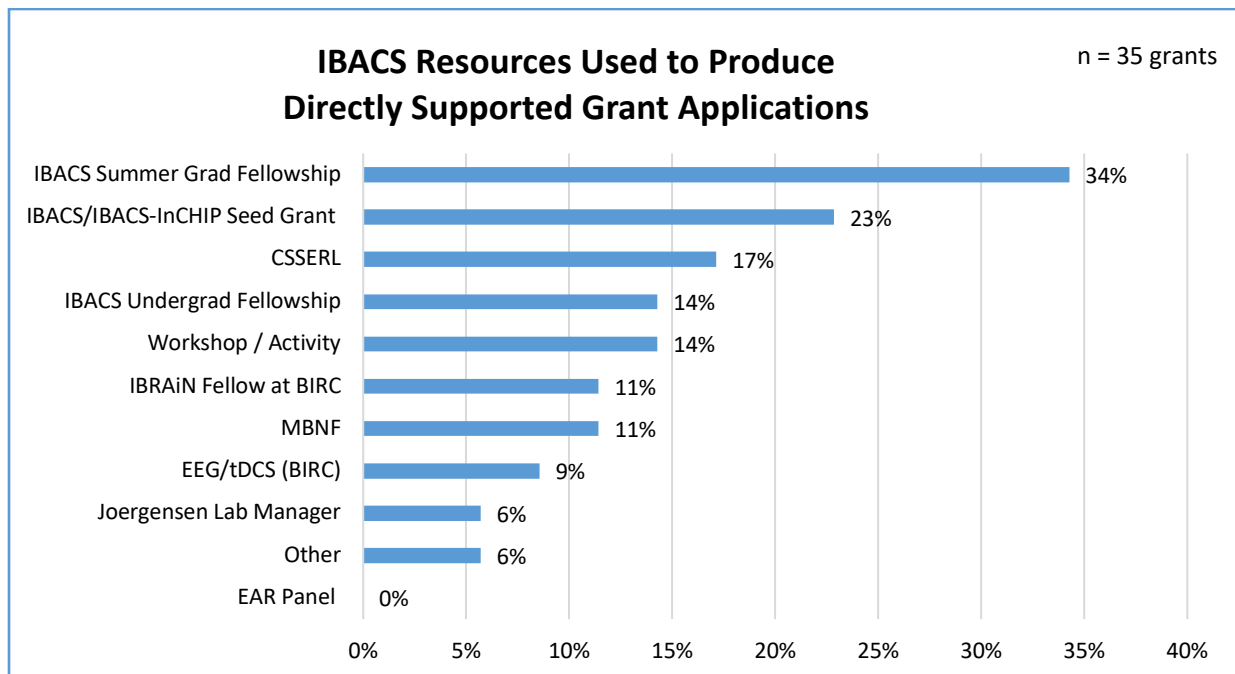

Directly Supported External Grant Applications
Two-Year Window (Years 5-6)

$3,152,305
$16,527,153
$19,805,152

■ awarded ■ pending ■ declined

Publications and other output: In Appendix 7 we list publications by Institute affiliates in two categories – *Directly* supported and *indirectly* supported. Institute affiliates were given the following guidance: *if the Institute had funded work that was described or referred to in the published work, or had funded work that led, one way or another, to the published work, then that constituted "direct support"*. There were 46 such articles (24 published, 5 under review, 10 in revision) identified **for the period 7/1/20– 6/30/21**, and 7 conference presentations. If the work had been "inspired" by IBACS-related activities or the ethos that has been generated since the inception of the Institute, then that would constitute "indirect support" (61 manuscripts – 48 published or in press) and 3 conference proceedings.

Use of Resources Supported by IBACS: The figures below demonstrate the use of resources directly supported by the Institute, July 1st, 2020 to June 30th, 2021. The first figure shows the percentage of respondents who used our resources in their research overall. The second figure shows the percent usage of each resource for directly supported grant applications. The third figure shows the percent usage of each resource for directly supported scholarly outputs.

Use of Resources Directly Supported by IBACS (reported by affiliates)   n = 91 respondents

Resource	Percent
IBACS Summer Grad Fellowship	40%
None	30%
IBACS/IBACS-InCHIP Seed Grant	29%
IBACS Undergrad Fellowship	15%
IBRAiN Fellow at BIRC	15%
Workshop / Activity	14%
CSSERL	11%
Joergensen Lab Manager	9%
EEG/tDCS (BIRC)	8%
MBNF	5%
Other	5%
EAR Panel	0%

*NOTE: the "none" category is higher than usual, and we attribute this to the pandemic causing labs to shutdown/slow down, with a consequent reduction in use of research resources. The pandemic also caused some central IBACS resources to shut down, including, for example, MBNF and other laboratories requiring in-person support/use.

IBACS Resources Used to Produce
Directly Supported Grant Applications

n = 35 grants

Resource	Percentage
IBACS Summer Grad Fellowship	34%
IBACS/IBACS-InCHIP Seed Grant	23%
CSSERL	17%
IBACS Undergrad Fellowship	14%
Workshop / Activity	14%
IBRAiN Fellow at BIRC	11%
MBNF	11%
EEG/tDCS (BIRC)	9%
Joergensen Lab Manager	6%
Other	6%
EAR Panel	0%

IBACS Resources Used to Produce
Directly Supported Scholarly Products

n = 40 products

Resource	Percentage
IBACS/IBACS-InCHIP Seed Grant	30%
IBACS Summer Grad Fellowship	28%
MBNF	23%
IBACS Undergrad Fellowship	15%
Other	13%
IBRAiN Fellow at BIRC	8%
CSSERL	8%
Joergensen Lab Manager	5%
Workshop / Activity	3%
EAR Panel	0%
EEG/tDCS (BIRC)	0%

6. GOING FORWARD: CHALLENGES

Each year there are new challenges, some unforeseen, and some that are constant:

- **Continued Funding:** During its first 6 years, funding for the Institute was negotiated by the Director with the offices of: the Provost, the Vice President for Research, and the College of Liberal Arts and Sciences (CLAS). Henceforth, funding will be managed through CLAS, with the Dean making appropriate representation to the Provost's and VPR's offices. As of writing, we have an informal commitment for YR 7 funding (FY21/22) at the same level as YR 6 funding. Because we were late to receive this commitment, we had frozen most activities in the period Jan-Jun 2021, including one round of seed grants. This was to enable the Institute to rollover funds to guarantee graduate fellowships, the IBRAiN program, and the MBNF in FY22 – commitments that had to be made before FY22 commenced (they all involve graduate fellowships). While new funding has been promised, it is just for one more year, and continued funding will be contingent on a formal Dean's review to take place during AY21/22. Now more than ever, the University's resources need to be targeted as effectively as possible. The Institute is well-placed to meet that challenge, and to help target those resources in ways that will build sustainable research programs that will further establish UConn as a leading research university. However, to do this effectively requires longer-term planning than year-to-year. In effect, FY21 was an interim year as we waited on financial commitments for FY22, and FY22 will again be an interim year, as we wait for funding commitments for FY23 and beyond. Critically, these interim years prevent the initiation of longer-term strategies. We hope that future funding will be longer term.
- **Projected Shortfall:** Each year we continually update our financial projections to ensure we do not end the financial year in deficit. We have again reached the end of this financial year with a modest credit in our accounts, notwithstanding the financial challenges of this last year (see previous point).
- **Institute Growth**: Growth has been limited in part because the Institute budget has remained static since FY16 while costs have increased (stipend and fringe costs, for example). Nonetheless, the Institute must continue to evolve to meet new challenges and opportunities. An informal working group has been tasked by the Dean of CLAS to consider how best the Institute can meet such challenges and opportunities. This working group consists of members of the IBACS Executive as well as the directors of other units in CLAS that have overlapping interests. This is separate from the formal "5-yr" review to be carried out in AY21/22. A number of avenues towards growth were detailed in a 5-yr Review document produced by the Institute in December 2020, and circulated to the Provost, the Dean of CLAS, and the OVPR. These avenues are currently on hold as we await the outcome of the ad-hoc working group, and the Dean's own input into the Institute's structure and function going forward.
- **Graduate Fellowship Applications**: Only 44% of our 2019 graduate fellowship cohort submitted an external grant. In 2020 the figure was 63%. We attribute this to changes in the funding model (how much they receive "up front" and how much on submission of an external grant) and in the competitiveness of the initiative (we reduced the number of fellows from 16 to 8 – in 2021 we funded 9 fellows. We have already seen an increase in applications for external fellowship funds and will continue to monitor this closely.
- **Unspent Seed Monies**: The Institute is continually monitoring the issue of unspent seed monies sitting in seed grant accounts. We have calculated that less than 10% of all seed awards are currently rolling over. We allow a one-year extension on the award automatically if needed, but once this year is over, we require a written explanation as to why an extension is necessary. Typical reasons for such requests include IRB approval delays and issues finding graduate students to take up the RA-ship required to complete the work. The Institute does recoup a

small number of unspent funds each year. ** Note that we expected this percentage to go up in FY21 as COVID-19 has pushed back many of our ongoing seed grant projects due to the temporary halt of research at UConn. However, this figure has stayed relatively stable at 10%.

- **Collecting Data Metrics**: Thirty-six percent of our affiliates submitted information during this year's data collection exercise (down from 45% last year). We used information about seed grant co-PIs, student advisors, and information on their users provided by BIRC/CSSERL/MBNF to identify directly-supported users who did not self-identify as such, and followed-up with individual emails requesting they provide the requested grants and outputs information at our online portal. Notwithstanding the challenge that this kind of data collection presents, *we believe that all members of the UConn community who received direct support from IBACS did submit information about grants and scholarly output.* However, an ongoing challenge is to ensure that researchers are aware of which facilities they have used, and who funds those facilities – the more a facility blends into the infrastructure, the less likely researchers will report using the facility. Last year, a number of faculty who made use of the IBRAiN program, CSSERL, or Dr. Joergensen's lab management (to use eye-tracking equipment in the Altmann lab) reported that they had used no IBACS resource. This year, we asked all facility/resource heads to forward our data collection email to all users and provide us with a list of those users so we could follow-up. We note that although a 9% decrease in affiliate participation is significant, it was anticipated as we only require affiliates who have received direct financial support from the Institute within the past two years to fill out the form (although we encourage all affiliates to do so). As stated earlier, research activity has been down due to the pandemic resulting in less IBACS seed grant and fellowship support.

- **Space:** We have two additional meeting rooms in Arjona, supported by CLAS, to complement the laboratory and teaching space already used there by PIs Altmann, Hancock, Large, Magnuson, Sprouse, Yee, and the SLAC and NBL graduate programs. We believe that the current activities continue to be a necessary first step towards building an environment in which a physical Institute could take shape, and we shall continue to work towards this long-term goal. While the Institute does now have an identity at UConn, having a physical focus that is specific to the Institute remains a longer-term goal, and the options for revenue generation that are under consideration may usefully impact on this goal. As a part of our 5-year internal review (feeding into our 5-year review by the Dean of CLAS) we have identified a number of activities which will create a more vibrant focus within Arjona, as well as generating greater "community feel" among the different constituencies we support. These will include "First Friday" meetings either in Arjona or coordinated from Arjona (with social distancing and Zoom protocols in place), inspired by the AI/Computational Modeling Meet-and-Speak we organized May 2020 over Zoom (with over 90 individuals in attendance, excluding the 12 speakers). These meetings were meant to roll-out this year, but UConn remained virtual.

- **Director**: The Director of IBACS, Dr. Gerry Altmann, will step down at the end of this financial year (June 30th, 2021). Altmann was the founding director, and steered the Institute proposal through the Academic Planning process in 2014 and through the formal approval process in 2015 (the original proposal for an Institute originated with the Cognitive Science Program; a committee chaired by Dr. James Magnuson initiated the original groundwork for the Institute, handing the reins to Altmann when he joined UConn in 2014). Altmann subsequently negotiated funding for two 3-yr terms: 2015-2018 and 2018-2021. In March 2019 the Institute was formally located within CLAS. The current ethos of the Institute, encouraging collaborative research across multiple departments, schools, and colleges, including UConn Health, has in large part been due to Altmann's continued efforts to "normalize" such cross-campus collaborations (the motivation for doing so is a part of the Institute's mission). This ethos will continue under the guidance of Interim Director Holly Fitch (Professor of Psychological Sciences, Director of the

MBNF, and member of the IBACS Executive since its inception). The Dean of CLAS will initiate an internal search for a new Director during FY22.

IMPACT OF COVID-19

- **Research projects:** Due to COVID-19, some of the Institute's supported research projects have been delayed. As a result, we have offered several seed grant extensions. We set aside funds last year to help alleviate some of the financial burden these research delays will have on the projects we fund and have provided additional funds to one PI so far.
- **Going Virtual**: The Institute co-hosted a Meet & Speak event on AI and computational modeling with the School of Engineering on May 6th 2020. We held this conference virtually over Zoom rather than postponing it to the Fall. We are planning, as detailed in our last annual report, a "First Friday" series, which will either be in-person or online, using the momentum from the AI/Computational Modelling meeting. Due to the ongoing pandemic through AY20/21 this has been put on hold and will be revisited in Fall 2021.
- **Use of Space**: The Institute has purchased an OWL telecommunication device to allow for hybrid virtual/in-person meetings to take place (and to support hybrid "First Friday" meetings).
- **Meeting/annual cycle changes:** Below is a list of all meetings and mechanisms IBACS has directly supported this past year, which have been impacted by COVID-19:
  - **Grant Writing Workshop:** IBACS has historically hosted this workshop in-person over the summer to assist our summer graduate fellows in writing external grant applications. We had to host this workshop virtually once again, and while we normally offer the workshop to more than just the IBACS graduate fellows, this year we limited attendance to just the fellows to make the online organization easier (it is an interactive workshop).
  - **High-School BIRC Field Trip**: IBACS facilitates an annual field trip in May with local high-school students enrolled in AP Psychology, Biology, or related classes to the Brain Imaging Research Center (BIRC) at UConn. Last year, the field trip was cancelled and this year, was held virtually. Students were given tours of the MRI, EEG and TDCS facilities, accompanied by a Q&A with BIRC's Associate Director, Roeland Hancock.
  - **Educational Playcare Fellowship**: IBACS did not receive any applications in FY21, which we suspect is due to a combination of parents being at home and some withdrawing from daycare temporarily due to COVID-19.
  - **Brain Digest:** The Institute's fourth digest focused on the lifespan and relevance for public policy will likely not be published until the end of Summer 21. Our graduate student editors found it difficult to conduct interviews with faculty in the midst of the University adjusting to and accommodating online instruction.
  - **IBACS Meet & Speak:** The Institute held the event virtually this year in October, after postponing it previously. We hope to hold our next one in person to bring back the social aspect of the event and encourage collaboration.
  - **Language Fest:** This event was postponed from May 2020 to April 2021 and was recently held virtually. While the event was very successful and attendance was high, we do hope the event can be in person next spring.
  - **Expression, Language and Music Conference (ELM):** This event has been postponed from May 2020 to tentatively May 2022.

7. BUDGET SUMMARY

The Appendix contains a summary of expenditure and commitments made. These figures may differ slightly from current account balances, due to unpaid commitments. We are grateful to Kane Lynch, CLAS Finance Director, for managing the Institute accounts and advising us on budgetary matters. To summarize income and expenditure:

Initial budget, July 1st 2020 – June 30th 2021:
        $350,000 from Tier 1 funding
        $152,756 Core Staff Carryover FY21
        $100,000 from VPR
        $110,000 from CLAS
        $143,135 FY21 rollover
        $3,486 data processing income
        $2,761 recouped seed/award funds
        $7,695 UCPEA/AAUP salary increase reimb.
        $ 869,834 total
Expenditure:
        $501,688
Remaining FY21 Commitments[1]:
        $72,730
Remaining FY22 Commitments[2]:
        $296,050
 TOTAL uncommitted to rollover into AY 2021/22:
        $17,028

We anticipate for FY 2021/22 the following funding:
        Provost's Office: $350,000
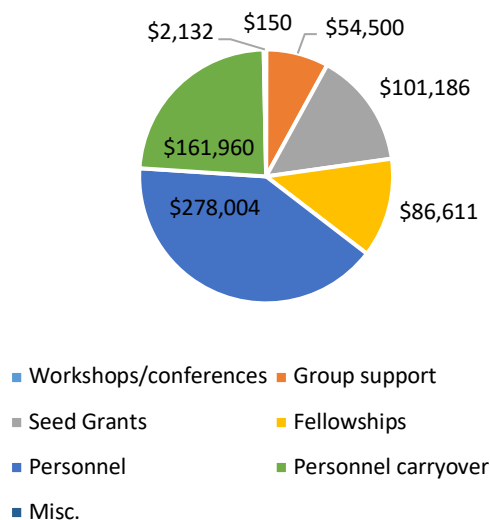   OVPR: $100,000
        CLAS: $110,000
        Committed Rollover: $296,050
        Uncommitted Rollover: $17,028
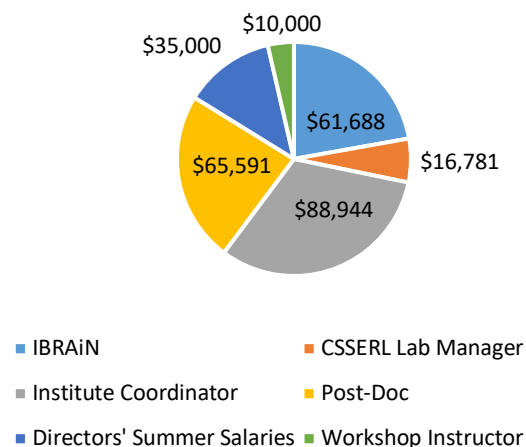   **TOTAL $873,078**

Notes

1. Remaining commitments include reserved funds for 9 summer 21 graduate fellowships and 1 month summer salary for the Director, two weeks for the associate director, and two weeks for the IBACS grant writing workshop instructor.

2. This includes $162K to be carried forward into FY21/22 to guarantee funds in FY21/22 for core staff: Coordinator (Mills), Lab Manager (Joergensen). The remaining funds are FY22 activities that were "saved" for in FY21 per the request of the CLAS Dean in anticipation of a funding freeze. This $107K is for 3 IBRAiN fellows and summer 22 fellowships, CSSERL lab manager, MBNF, EPC fellowships, Opportunity fellowship, and printing of the Brain Digest.

Year 6 Total Spending

- Workshops/conferences
- Group support
- Seed Grants
- Fellowships
- Personnel
- Personnel carryover
- Misc.

Personnel Payroll

- IBRAiN
- CSSERL Lab Manager
- Institute Coordinator
- Post-Doc
- Directors' Summer Salaries
- Workshop Instructor

8. CASE STUDIES: INSTITUTE-SUPPORTED COLLABORATIONS

Here, we very briefly outline 2 case studies that illustrate the interactive role that IBACS plays in supporting extramural grant activity.

1. Interfering Grammars: How bilinguals manage different, sometimes conflicting, grammatical rules**:** This first case study describes issues in bilingualism.
2. Predicting Neurodevelopmental Outcomes for Premature Infants Using Absolute Telomere Length**:** The second case study concerns a research project into markers of resilience in infants born pre-term.

Interfering Grammars: How bilinguals manage different, sometimes conflicting, grammatical rules

    Dr. Adrián García-Sierra and his graduate student Noelle Wig, in the Department of Speech Language and Hearing Sciences, are experts on bilingual processing. Adrián is himself a Spanish/English bilingual. He knows only too well that the white paper on which these words could be printed is "white paper" in English, but "papel blanco" (literally, "paper white") in Spanish. One might think that when Adrián's speaking English, his mind "switches off" its knowledge of Spanish, allowing him to produce the right word order in English. And conversely, when speaking Spanish, that his English is switched off. Similarly, when listening. But research in his own and other labs has shown that this isn't the case. Instead, both languages actively "listen" to the input, with whichever is the currently spoken or heard language being the more dominant one in the moment. But this leads to the following question: If Adrián hears "pick up the paper white", which has the Spanish word order albeit with English words, will he be more *tolerant* of the word-order error *because he is bilingual*? And if he were speaking, and he made this error, would it reflect a lack of proficiency in English, or would it reflect his proficiency in both English *and* Spanish (with the Spanish word order "breaking through" in this case)?

    In early 2020 (pre-lockdown), IBACS funded Adrián and Noelle to explore these questions using EEG (Electroencephalography) – a technique that has been used very successfully to explore the brain's response to language input. They proposed to use the technique to ask, specifically, whether bilingual Spanish/English listeners would be more tolerant of that (English) word order violation, as well as the Spanish equivalent ("*recoge el blanco papel*"). But the pandemic hit before they could start work. Adrián contacted Gerry Altmann (IBACS Director) to discuss the situation, and they soon realized that the same questions could be addressed using a quite different methodology, but one that Altmann had been using for years – monitoring eye movements as participants view visual scenes presented on a computer display and as they listen to sentences that describe what might happen to the objects in those scenes. Of course, eye-tracking during the pandemic was out of the question. But writing a grant that would include both the EEG *and* eye-tracking was not, and the legacy of the pandemic for the García lab is an application submitted to NSF to conduct the proposed studies.

Predicting Neurodevelopmental Outcomes for Premature Infants Using Absolute Telomere Length

Annually, around 15 million babies are born preterm (<37 weeks' gestational age) globally. In the neonatal intensive care unit (NICU) environment, infants are exposed to repeated stressful or painful procedures as part of routine life-saving care. These procedures have been associated with epigenetic alterations that may lead to increased risk of subsequent neurodevelopmental disorders. These alterations seem to affect "telomeres" – bits of DNA at the ends of chromosomes that play an important role in ensuring that DNA gets copied properly (think of the caps ("aglets") on the ends of shoelaces that keep them from fraying); longer telomeres are associated with fewer adverse life experiences in studies of adults.

In early 2019, Dr. Sharon Casavant from the School of Nursing, applied for an IBACS seed grant to study telomere length in premature infants and its consequences for subsequent development. The review process identified one key problem – what if there were no such relationship in pre-term infants between telomere length and developmental outcome? No one had shown such a relationship – this really was a cutting-edge research question. But if there were no such relationship, there would be no point doing the follow-ups that Casavant had proposed. So the proposal was revised to focus on establishing that key relationship, and it was funded in the Fall of 2019.

The aim of this more focused study was to establish telomere length in a sample of preterm infants at NICU discharge, 8-12 months and 18-24 months in the NICU follow-up clinic and examine any associations with pain, feeding method and neurodevelopment. However, many of these infants' follow-up clinic appointments became virtual with the onset of COVID-19 which meant that the research team were unable to collect biological samples at the additional time points. The pandemic severely impacted the research. Nonetheless, they did have a small number of sample at the additional time points. One additional problem was that the team were unable to secure many of the consumable items needed to run the additional samples (if, that is, they had been able to collect them).

This pilot study (to appear in *Nursing Research*) managed to include baseline absolute telomere length (aTL) for 36 preterm infants immediately prior to NICU discharge. Quantitative polymerase chain reaction (qPCR) was used to determine absolute telomere length. Infant demographics, pain/stress, type of feeding, antibiotic use, neurodevelopment and buccal swab data were collected. Descriptive data analysis was used to describe telomere length and its relationship to these other factors. Among these samples, the mean absolute telomere length was far greater than the average adult telomere lengths. While no statistically significant associations were found between absolute telomere length and pain, feeding method or neurodevelopment, a trend between sex was noted where male telomere lengths were shorter than females as they aged (and some studies have found that pre-term females have better outcome than males). It is regrettable that the pandemic prevented collection of telomere samples at the later timepoints, as it may be the nature of the *changes* in telomere length with age that are associated with atypical neurodevelopment.

This is the first study in the United States with a sample size greater than 10 and one of four globally to evaluate preterm infant telomere length. While the other studies used relative telomere length, Casavant's team used the more accurate absolute telomere length. The research is ongoing.

APPENDICES

1. Budget Summary

2. Recipients and topics of IBACS Seed Grants

3. Recipients of IBACS Graduate Summer Fellowships

4. Recipients of IBACS Undergraduate Research Fellowships

5. Recipients of IBRAiN Assistantships and IBACS-InCHIP Fellowships

6. Activity reports from: BIRC (IBRAiN program), CSSERL, MBNF, ECOM and IBACS lab manager

7. Publications describing IBACS-supported research

8. Meet and Speak Program

APPENDIX 1

BUDGET SUMMARY

STARTING BUDGET $869,834 (see Revenue entry below)

Expenditure and Commitments   *notes*

meetings

IBACS Meet & Speak	$150	Zoom subscription. All other meetings held virtually, no expenses.

group support

Murine Facility	$48,000
ECOM	$3,500
BIRC Equipment	$3,000

seed grants & fellowships

Fall 2020 & Spring 2021 seed grants	$91,186
Spring '20 Xygalatas seed grant	$10,000
IBRAiN Summer 2021 fellowships	$20,000
Fellowship residual Summer 2020	$15,000
Grad fellowships Summer 2021	$18,000
UG fellowships	$27,611
Brain Digest fellowships	$6,000

misc.

Misc. expenses[1]	$2,132

personnel

IBRAiN Fall 2020/Spring 2021	$61,688
CSSERL Lab Manager	$16,781
Core staff salary carryover	$161,960
Admin & Postdoc (67%) – Core staff	$154,534
Directors' summer salaries:	$35,000
Grant Writing Workshop sum. salary	$10,000

Total spend to date	**$501,689**
Total remaining FY21 commitments	**$72,730**
Total FY22 commitments	**$269,050**
TOTAL uncommitted to rollover into FY22	**$17,028**

Revenue ($869,834)

$350,000	Provost
$110,000	CLAS
$100,000	VPR
$152,756	Core staff rollover
$143,135	Rollover Yr. 5
$3,486	Data processing income
$2,761	Seed grant/award recoup
$7,695	UCPEA/AAUP salary increase reimbursement

[1]Includes: Dropbox license and a laptop for IBACS student worker.

APPENDIX 2

IBACS SEED GRANTS

Only the lead PI is listed, although in all cases there were one or more collaborators and Co-PIs. Details of each can be found at: http://ibacs.uconn.edu/research/

FALL 2020

Lead PI	Dept.	Title	Award Amount
Brodbeck, Christian	PSY	Research Professor Proposal: Start-up funds	$10,000
Landi, Nicole	PSY	Decoding dyslexia: decoding the human mind	$16,194
Manning, Kevin	UCHC	Testing Adaptive Interoception in Aging using Bladder Sensations and Simulated Driving	$24,993

SPRING 2021

Bae, Byoung-Il	UCHC	Abnormally Enlarged Prefrontal Cortex in Autism Spectrum Disorder	$25,000
Xygalatas, Dimitris	ANTH	Post-COVID Recovery	$5,000

APPENDIX 3
GRADUATE SUMMER FELLOWSHIPS

Name	Department	Advisor
Armstrong, William	Physiology & Neurobiology	Alexander Jackson
Chiovaro, Megan	Psychological Sciences	Alexandra Paxton
Davinson, Kelsey	Psychological Sciences	Kimberly Cuevas
DeNegre, Katelyn	Molecular & Cell Biology	Michael O'Neill
Hall, Caitrin	Psychological Sciences	Alexandra Paxton
Lautz, Nathan	Psychological Sciences	Eiling Yee
McLeod, Ruth	Psychological Sciences	Holly Fitch
Mechtenberg, Hannah	Psychological Sciences	Emily Myers & Eiling Yee
Mooney, Katelyn	Physiology & Neurobiology	Geoffrey Tanner

APPENDIX 4

IBACS UNDERGRADUATE RESEARCH FELLOWSHIPS

Name	Department	Advisor
Acorda, Margaux	Psychological Sciences	Inge-Marie Eigsti
Arciero, Olivia	Psychological Sciences	Letty Naigles
Evans, Tristan	Molecular & Cell Biology	Michael O'Neill
Kenny, Murphy	Physiology & Neurobiology	Linnaea Ostroff
Levin, Julia	Psychological Sciences	Etan Markus
Logan, Audra	Psychological Sciences	Umay Suanda
Masthay, Jamie	Psychological Sciences	John Salamone
Patel, Siddhe	Psychological Sciences	Etan Markus
Zhou, Xinming	Psychological Sciences	Emily Myers

APPENDIX 5

IBACS BIRC RESEARCH ASSISTANTSHIPS IN NEUROIMAGING (IBRAIN)

Name	Department	Advisor
Oshiro, Briana	Mathematics	Thomas DeFranco
Ozercan, Aliyar	Philosophy	Mitchell Green
Sklenarik, Skyler	Psychological Sciences	Robert Astur
Wei, Yi	Psychological Sciences	Edward Large

APPENDIX 6

IBACS AFFILIATED GROUP REPORTS

A. BIRC IBRAIN PROGRAM (submitted by Dr. R. Hancock)

B. CSSERL (submitted by Dr. J. Magnuson)

C. MBNF (submitted by Dr. R. Fitch)

D. ECOM (submitted by Dr. D. Bar-On)

E. IBACS LAB MANAGER (submitted by Dr. G. Joergensen)

A.   BIRC IBRAiN Program 2020-2021

The IBACS-BIRC Research Assistantships in Neuroimaging (IBRAiN) program supported 4 graduate students during FY21. Students participate in three main activities:

The IBACS-BIRC Research Assistantships in Neuroimaging (IBRAiN) program supported 4 graduate students during FY21, reduced from 5 students in FY20. Students participated in two main activities:

Training

IBRAiN students received formal training in neuroimaging methods, design, and analysis, primarily using the popular FSL software package and containerized preprocessing pipelines.

The fellows also receive more generalized scientific training to prepare them for the increasing need to handle big data and conduct reproducible and transparent research. This aspect of the training has emphasized:

- The importance of reproducible research
- The use of tools to facilitate reproducible research, e.g. standardized file hierarchies and GitHub (used for homework submission and feedback).
- Use of high-performance computing and big data infrastructure.

Study logistics and PsychoPy task development were added as new training modules in FY21.

The 2020-2021 IBRAiN cohort (one student) also received hands-on training in operating the MRI scanner. The student conducted 20 research MRI studies under technologist supervision.

Research Support

The fellows provide individual training and guidance to PIs and their students, helping to advance research programs for faculty who would like to conduct neuroimaging research, but may not have the necessary expertise in their own labs, while acquiring additional hands-on experience to further develop the fellows' expertise and intellectual breadth. The fellows supported PIs from multiple colleges and departments who received BIRC or IBaCS seed grants and/or use BIRC resources, including: Buck (Communication), Hoeft (Psychology), Mozeiko (SLHS), Park (Psychology), Shook (Nursing), Snyder (Linguistics), and Pescatello (Kinesiology). IBRAiN students also generated $8,850 in revenue from fee-based data analysis services.

The fellows also presented a tutorial workshop, "Introduction to fMRI Preprocessing with BIDS Apps" to the neuroimaging community.

B.   CSSERL 2020-2021

Director: James Magnuson

Jayeon Park was employed in an IBACS-funded RAship for 10 hours / week. In this document, we refer to "eBRAIN RAs"; "e" stands for "electrophysiology". We can best summarize their activities by placing them in three categories: administration and maintenance, support, outreach, and research. Activities were distributed differently than in past years because of the pandemic. The RA primarily worked remotely (with additional focus on calendar and website maintenance, developing written lab resources, and developing skills and consulting with users).

Administration and Maintenance
This category includes activities that ensure the facility and its infrastructure are in top shape. These activities include:
➢   Monitoring and maintaining the online calendar system.
➢   Administering the website.
➢   Verifying equipment for cleanliness, proper storage, concerns regarding wear and tear; this includes fine technical work that requires substantial training and care, such as careful sanding of electrodes that show signs of corrosion.
➢   Managing laundry services (towels).
➢   Monitoring consumables (e.g., electrode contact gel, shampoo, syringes) and ordering supplies when needed.
➢   Developing lab manuals that will help future eBRAIN RAs and lab users.
➢   Administering 7 computers (keeping operating systems and software up to date, monitoring data storage, installing user-requested software).
➢   Meeting with faculty supervisors
➢
Support
•   The eBRAIN RAs provide a variety of support services to lab users, including EEG/ERP experiment design, equipment and software assistance, and analysis support.

Research
The eBRAIN RAs are authorized to devote unassigned time to EEG-related activities like reading papers or books or learning new software. This time enhances the knowledge of the RAs and their ability to provide expert service.

Labs that have benefited from eBRAIN activities this year
Many users from 2019-20 did not conduct research in person, but the following groups made use of the physical facilities and/or the eBRAIN RA's time:

Large (PSYC:PAC), Read (PSYC:BNS), Skoe (SLHS), Sprouse (LING), Hoeft (PSYC:PAC)

CSSERL USAGE
Despite the pandemic, we tracked 1240 hours of usage from 7/1/20 to 6/30/21. This included 935 hours for Read & Large, 282 hours for Hoeft, and 23 hours for Skoe.

SUMMARY STATEMENT AND REQUEST FOR CONTINUATION. Despite the pandemic, CSSERL usage increased dramatically in 2020-21. As we return to in-person activities in 2021-22, we anticipate substantial growth. Although the eBRAIN RA participated in different ways this year -- primarily remotely -- RA support from IBACS supports essential services to users and potential users of CSSERL. The eBRAIN

support for CSSERL has allowed us to expand usage and support in ways that would simply not be possible if managing the space were only up to the 4 core faculty (Large, Magnuson, Skoe, Sprouse).

PRESENTATIONS (including a few that were not reported last year)

1. Darling, S.(u), Alexander, K.(u), Morrow, H. M.(g), & Yee, E. (2020). A cautionary tale about the importance of taking individual differences into account when examining whether tDCS can enhance cognitive control. Poster presented at the Annual Meeting of the Cognitive Neuroscience Society, Virtual Conference, May 2020.
2. Darling, S.(u), Alexander, K.(u), Morrow, H. M.(g), & Yee, E. (2021). A cautionary tale about the importance of taking individual differences into account when examining whether tDCS can enhance cognitive control. Poster Presented at the University of Connecticut Language Fest.
3. Grubb[u], S., Dalal[u], P., Daniel[u], J., Peraza-Santiago[u], G., Luthra[g], S., Saltzman[g], D., Xie[u], B., Crinnion[g], A.M., & Magnuson, J. S. Talkers, time, tasks, and similarity in spoken word recognition. Psychonomic Society, Virtual Conference, November 2020.
4. Park, Jayeon, Satoshi Tomioka, and Jon Sprouse. 2020. The sustained anterior negativity and syntactic movement dependencies in Korean. Talk presented at the 28TH Japanese/Korean Linguistics conference. University of Central Lancashire. September 7.
5. Parker, A., Parham. K., Skoe, E. (2020, September 25-27). Characterization of Serum Prestin as a Biomarker of Inner Ear Health [Conference presentation]. American Academy of Otolaryngology– Head and Neck Surgery, Boston, MA, United States (Virtual).
6. Parker, A., Parham. K., Skoe, E. (2020, January 25-28). Test-Retest Reliability of Serum Prestin Levels in Normal Hearing Young Adults [Conference presentation]. Association for Research in Otolaryngology, San Jose, CA, United States.
7. Parker, A., Parham. K., Skoe, E. (2020, April 1-4).Measuring Serum Prestin Levels in Normal Hearing [Conference presentation]. American Academy of Audiology, New Orleans, LA, United States (Virtual).
8. Peraza-Santiago[u], G., Beeson[u], K., Luthra[g], S., Saltzman[g], D., Crinnion[g], A. M., & Magnuson, J. S. Robust lexically-mediated compensation for coarticulation (LCfC) supports feedback in spoken word recognition. Psychonomic Society, Virtual Conference, November 2020.

PUBLICATIONS

1. Parker, A., Parham, K., & Skoe, E. (2021). Reliability of Serological Prestin Levels in Humans and its Relation to Otoacoustic Emissions, a Functional Measure of Outer Hair Cells. *Ear and Hearing*. ****volume publish ahead of print, thus, missing some details****
2. Parker, A., Parham, K., & Skoe, E. (Under Review). Noise exposure levels predict blood levels of the inner ear protein prestin. *Scientific Reports.*
3. Zhai X, Khatami F, Sadeghi M, He F, Read HL, Stevenson IH, and Escabi MA (2020). Distinct midbrain response statistics are associated with sound recognition and discrimination during the construction of natural sound textures. *PNAS* 117 (49) 31482-31493

GRANT ACTIVITY

1. PI: Silvia Clement-Lam (postdoc), Mentors: Hoeft, Magnuson, Kearns, Co-I: Landi. NIH F32. Investigating orthography-phonology and orthography-semantics pathways with implications for compensatory mechanisms in reading disorder in the context of a randomized control trial. 09/01/2021 - 8/31/2023. $134,952.00. **Pending** (5% score, almost certain to be funded).
2. PI: Monty Escabí (Co-Is: Read, Stevenson). 1R01DC015138-01. CRCNS: The role of sound statistics for discrimination and coding of sounds. 2015-2020. $1,449,437. **Completed**.
3. PI: Fumiko Hoeft, Co-PI: Stephanie Haft (UC Berkeley), Devin Kearns. Oak Foundation, OCAY-19-215. Supporting optimal outcomes for students with learning differences. 09/01/2019 – 08/31/2022. Total cost: $769,578 (20% IDC). **Funded**.

4. PI: E. Large. NCCIH, 2022-29, An Interactive Rhythm-Based Intervention for Language Skills in Aphasic and Dyslexic Populations, (R61/R33), PI, $1,894,876. **In preparation.**
5. PI: Kourosh Parham,   Co-I: Skoe. American Tinnitus Association. Serum Prestin as a Tinnitus Biomarker . July 2021-July 2022. $60,000. Submitted April 2021. **Under review**.
6. PI: A. Parker (sponsor: E. Skoe). NIH F31 Predoctoral Fellowship. Prestin as a Biological Marker of Hearing Loss. June 2021 - May 2023. $101,796. **Not funded**.

C.   **MBNF 2020-2021**

Director: R. Holly Fitch

•**The** *Murine Neurobehavioral Genetics Facility* **(MBNF) was created in 2015 through the Provost's Tiered Initiative; $600,00 was received from UConn in Years 1-3 (2015-18).**

In **Year 1** we received $250,000 from the Provost/CLAS; these funds were allocated to equipment (facility development), animal acquisition, and establishing/training Personnel to staff the facility (fulltime RA). **Years 2 and 3** funds went to supplies, animal costs, and Personnel, allowing us to fully subsidize all projects performed for PIs during that period. The Director's effort (meeting with PIs before, during and after project implementation, monitoring projects, interpreting data) was *gratis*.

•**The MBNF targets a strategic emphasis on research, scholarship, and graduate education, and is aligned with specific UConn investments in** *Brain/Cognition* **and** *Genetics/Genomics***.**

MBNF services center on *behavioral phenotyping of genetically engineered mouse models,* similar to an NIH Core*.* Since 2015 the PI/Director (Fitch) has launched inter-disciplinary projects using both "forward" and "reverse" genetic approaches. We serve "forward" projects for cellular/molecular scientists with existing genetic mouse models and limited ability to assess systemic/functional gene impacts (Kanadia (PNB), O'Neill (MCB), Nishyama (PNB), Jackson (PNB), Volgushev (BNS), and Li (UCHC)). These PIs seek behavioral expertise to design/implement functional characterizations of their engineered models; the MBNF provides these services, with results individually analyzed/interpreted in a *Final Report*. From "reverse" perspective, we work with cognitive and clinical scientists to develop *de novo* mouse models and tasks to test core gene-behavior theories of typical and atypical human behavioral/cognitive processes (Eigsti (CLIN), Altmann (PAC), Chamberlain (UCHC), Newbury (Oxford)). Here, the Director works with PIs to create or locate a relevant mouse model, and then identify or develop unique tasks to test human-relevant processing models. All testing is performed by a single GA with undergrad assistance.

•**In 2018, the IBACS agreed to umbrella the MBNF under its administrative structure, with subsidized support for continued staffing. MBNF now functions as a subsidiary of IBACS.**

In **Year 4,** IBACS provided subsidy for a fulltime RA *($40K, 2018-19)*, which was supplemented by **Year 3** MBNF rollover funds, and by direct income to MBNF from REP and external awards to users. In **Years 4 & 5**, IBACS shifted MBNF support to GA funding (better economic valuation with concomitant training opportunities; *$40K, 2019-20*), again supplemented by funding from facility users.

•**We are requesting continued subsidy of the MBNF by IBACS at a slightly reduced amount, 30K/year in Year 6, due to IBACS budgetary concerns**. **These funds will enable a continuation of important resources for UConn PI's.**

For ROI, the MBNF provides: pilot data and resources for **grant applications** (more than a dozen *LOS* to external applications provided); data for joint inter-disciplinary **publications** (25+ journal articles and 100+ poster presentations and talks using MBNF-generated data); unique opportunities to test **novel inter-disciplinary hypotheses**; promotion of **cross-departmental and cross-campus collaborations** (having served PNB, MCB, BNS and UCHC); collaborations with external PIs (projects with Oxford, Cambridge); and **graduate/undergraduate training** (5 graduate students have included MBNF data in UConn Dissertations; 30+ undergrads have received training experiences).

•**COVID Impacts**

The MBNF was particularly affected by COVID in spring 2020, following requests by ACS to sac a large number of animals. This stemmed from reductions in ACS staff, coupled with staff distancing

requirements. Hundreds of mice were abruptly euthanized from active studies for Salamone, Fitch, Li, and other MBNF users. The studies were in various degrees of completion. Given the lag time for re-breeding, and the restrictions on getting MBNF staff back into the lab, this caused delays ranging from 6 months to 8 months for 5-6 research studies. All of these studies have subsequently been re-initiated, but data collection and publication has been substantially delayed.

•**Although the MBNF is a relatively targeted facility with a narrow user pool, those users have benefited tremendously from MBNF services. This has enhanced PI research trajectories, created new collaborations, inspired external grant applications, contributed to local and international presentations, *directly* generated dozens of publications, and indirectly supported many more.**

D.   ECOM 2020-2021

Director: Dorit Bar-On

About ECOM

Prof. Dorit Bar-On brought the Expression, Communication and Origins of Meaning (ECOM) research group to UConn in 2014, having established it at UNC - Chapel Hill in 2010. ECOM is a hub of interdisciplinary research activity at UConn, with connections across the U.S. and around the world. ECOM facilitates collaborations among researchers in philosophy, linguistics, psychology, cognitive science, anthropology, biology and neuroscience. In addition to Director Dorit Bar-On, ECOM has 13 active faculty members at UConn including Professor Emerita Ruth Millikan (philosophy), Prof. William Snyder (linguistics), and Prof. Letitia Naigles (psychology). ECOM also has 20 active graduate student members across philosophy, psychology and linguistics and is also officially affiliated with 17 faculty members and graduate students outside UConn. Within UConn, ECOM is affiliated with the Philosophy department, the Humanities Institute, the Institute for the Brain and Cognitive Sciences (IBACS), and the Cognitive Science program. In the Spring of 2021, ECOM has taken initial steps to establish collaboration with the Cog Sci program at Dartmouth College (a member of the New England Humanities Consortium).

ECOM during Academic Year 2020/21

2020-21 was the ECOM 'graduate year'. We aimed to increase the participation of graduate members at all levels: number of graduate members, number of graduate presentations, and the visibility of our graduate conference. 4 new graduate students joined as members, and 16 more people joined the ECOM listserv. Currently, the ECOM listserv reaches 117 scholars. 6 of our graduate members gave presentations as a part of our ongoing Spotlight Series, sharing their current research with the ECOM community.

The second ECOM Graduate Conference – "Kinds of Mindreading" – was organized by ECOM graduate members and was held online on February 6, 2021. Our keynote speakers were Prof. Helen Tager-Flusberg (Boston University, Department of Psychological & Brain Sciences) and Prof. Jonathan S. Phillips (Dartmouth College, Departments of Cognitive Science, Philosophy, and Psychological and Brain Sciences); and we hosted 6 speakers working on Theory of Mind in Philosophy, Neuroscience, and Psychology Departments. Kinds of Mindreading drew a great deal of attention from all over the world. We received more than 40 submissions, 140 conference registrants, and had around 80 participants at various times during the conference. The conference received a number of unsolicited advertisements from notable scholars on various listservs. It was, by all accounts, a great success.

Continuing with the theme of year, Theory of Mind, we invited two speakers to our regular speaker series in the Spring: Prof. Richard Moore (Senior Research Fellow, Department of Philosophy, University of Warwick), who gave a talk on January 28, 2021; and Emeritus Prof. Peter Gardenfors (Lund University), who gave ECOM's last talk of the year on April 23, 2021.

In addition, ECOM members organized three reading groups during 2020-21. In Summer 2020, ECOM held a Mind & Language Reading Group, which read various papers on language and mind. In Fall and Spring 2020, ECOM member Drew Johnson held a regular reading group on Christine Korsgaard's *Fellow Creatures: Our Obligations to the Other Animals.* ECOM members from UConn and the UK met to read Ruth Millikan's *Varieties of Meaning* in Spring 2021. Several ECOM members participated in an international seminar on Millikan's work organized by two philosophers from Tuebingen University.

Three ECOM graduate members assisted in research for an ECOM-related co-authored volume – *Expression and Self-Knowledge*, by Dorit Bar-On and Crispin Wright – in the Wiley's *Great Debates* series. Four ECOM graduate members received modest fellowships to support their ECOM-related research during the Fall and Spring

Before the pandemic, Prof. Bar-On and a team of UConn faculty collaborators launched a new biennial interdisciplinary conference titled Expression, Language and Music (ELM), for which Bar-On secured substantial funding from the UConn CLAS and OVPR. We had eight distinguished invited speakers (including Ray Jackendoff, Jerrold Levinson, Tecumseh Fitch, and Elizabeth Margulis). In addition, 12 contributing speakers and 18 poster presentaters were selected. The first Meeting of this conference was scheduled for May 2020; it had to be tentatively rescheduled for May 2021, due to the pandemic. It has now been rescheduled again for August 2022, in hopes the conference it can be held in person. Fortunately, just about all our speakers have agreed to participate at the rescheduled conference.

Papers, Conference Presentations, Awards & Honors

During 2020-21, ECOM members have published more than 50 ECOM-related papers. (Of these, 15 were by graduate members.) ECOM members have also given a significant number of conference presentations.

ECOM director Bar-On has received a prestigious NEH Research Fellowship for the calendar year 2021 to complete a manuscript titled *Expression, Communication, and Origins of Meaning.*

E. IBACS LAB MANAGER 2020-2021

Dr. G. Joergensen spends 1/3 time managing Yee Lab (currently paid for by Yee), and 2/3 time (paid by IBACS) managing Altmann Lab, and the IBACS projects listed here:

Summary: 10 IBACS projects with 9 PIs (and additional collaborators) across 4 departments. Five of these on MRI and simultaneous eye-tracking in BIRC (marked * below), and 4 on eye-tracking (†) using the shared resources in Arjona/CSSERL.

Name of study	PI	Department
*Brain Mechanisms of Empathy: A Study Using Spontaneous, Dynamic, and Naturalistic Displays	Ross Buck	Communication
*The neural correlates of early word recognition[1]	Jay Rueckl	Psychology (PAC)
*An exploratory fixation-related fMRI study of text reading in poor comprehenders[2]	Nicole Landi	Psychology, (DEV)
*Intervention & Neuroimaging for Polysyllabic Word Reading[2]	Devin Kearns	NEAG
ASD Optimal Outcomes[3]	Inge-Marie Eigsti	Psychology (CLIN)
*OAK: Simultaneous fMRI/eye tracking, reading	Fumiko Hoeft	Psychology (PAC)
†Simultaneous EEG/eye tracking, reading	Fumiko Hoeft	Psychology (PAC)
†Learning from the news: Eye-tracking perspective	Anne Oeldorf-Hirsch	Communication
†Language-mediated eye movements and cochlear implants[4]	Rachel Theodore	SLHS
†Eye-tracking with kids	Letitia Naigles	Psychology, (DEV)

Note 1: Project currently on hold.
Note 2: Project was merged with the OAK study.
Note 3: Eye-tracking component no-longer needed.
Note 4: Project is in data analysis/write-up phase

APPENDIX 7

PUBLICATIONS:

July 1st 2020 – June 30th 2021

Recipients of seed grants, and affiliate members, were asked to submit articles and book chapters published since July 1st 2020 that were supported directly or indirectly by IBACS. **"Direct Support"** means that the Institute had funded work that was described or referred to in the published work, or had funded work that led, one way or another, to the published work. **"Indirect Support"** means work that had been "inspired" by IBACS-related activities or the ethos that has been generated since the inception of the Institute. Names in bold indicate IBACS affiliates.

A. DIRECTLY SUPPORTED OUTPUTS

1. *Peer Reviewed Journal Articles Directly Supported by IBACS, published or in press*

Biswas, J., **Pijewski, R. S.**, Makol, R., Miramotes, T. G., Thompson, B. L., Burghard, A. L., Oliver, D. L., & **Martinelli, D. C.** (2021). C1ql1 is expressed in adult outer hair cells of the cochlea in a tonotopic gradient. *PLOS ONE, 16*(5), 0251412. PMID: 33979385.

Casavant, S. G., Chen, J., Lainwala, S., Matson, A. Chen, M.H., Starkweather, A., Maas, K., & **Cong, X.** (in press). Multi-omics analysis on neurodevelopment in preterm neonates: A protocol paper. Nursing Research.

Casavant, S. G., Li, H., Reese, B., Chen, M. H., & **Cong, X.** (in press). Pilot study of absolute telomere length in preterm infants. *Nursing Research*. doi: 10.1097/NNR.0000000000000535. Online ahead of print.

Casavant, S. G., Meegan, T., Fleming, M., Hussain, N., Gork, S., & **Cong, X.** (2021). Integrated Review of the Assessment of Newborns With Neonatal Abstinence Syndrome. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, ISSN 0884-2175, https://doi.org/10.1016/j.jogn.2021.04.014. (https://www.sciencedirect.com/science/article/pii/S0884217521000897)

Chasse, R. et al. (2021). Altered Heterosynaptic Plasticity Impairs Visual Discrimination Learning in Adenosine A1 Receptor Knock-Out Mice. *The Journal of Neuroscience, 41*(21), 4631-4640.

Chasse, R., Malyshev, A., **Fitch, R. H.,** & **Volgushev, M.** (2021). Altered heterosynaptic plasticity impairs visual discrimination learning in adenosine A1 receptor knockout mice. *J Neurosci*. Apr 13:JN-RM-3073-20. doi: 10.1523/JNEUROSCI.3073-20.2021. Epub ahead of print. PMID: 33849950.

Davis, C. P. & **Altmann, G. T. M.** (2021). Finding event structure in time: What recurrent neural networks can tell us about event structure in mind. Cognition, 104651.

Ekves, Z., **Prystauka, Y**., **Davis, C. P.**, **Yee, E.,** & **Altmann, G. T. M.** (2021). Psychology of Cleansing through the Prism of Intersecting Object Histories. Commentary on Grounded procedures: A proximate mechanism for the psychology of cleansing and other physical actions. *Behavioral and Brain Sciences*, *44*(4).

Ganugapati, D. & **Theodore, R. M.** (In press). Structured phonetic variation facilitates talker identification. *Journal of the Acoustical Society of America*.

Hardy, C. C., Al-Naggar, I. M., Kuo, C.L, **Kuchel, G. A.**, & **Smith, P. P.** (2021). Aging Changes in Bladder Hyperpolarization-Activated Cyclic Nucleotide-Gated Channels Are Associated With Increasing Heterogeneity of Adrenergic/Mucosal Influence on Detrusor Control in the Mouse. *J Gerontol A Biol Sci Med Sci*., 76(7):1153-1160. doi: 10.1093/gerona/glab070. PMID: 33693872; PMCID: PMC8202151.

Kang, X., **Joergensen, G. H.**, & **Altmann, G. T. M.**, (2020). The activation of object-state representations during online language comprehension. *Acta Psychologica. 210*, doi: 10.1016/j.actpsy.2020.103162.

Nguyen, E. & Pearl, L. (in press). The link between lexical semantic features and children's comprehension of English verbal passives. *Language Acquisition*.

Parker, A., Parham, K., & **Skoe, E.** (2021). Reliability of serological prestin levels in humans and its relation to otoacoustic emissions, a functional measure of outer hair cells. *Ear and Hearing*. doi: 10.1097/AUD.0000000000001026.

Perdue, M. V., Mednick, J., Pugh, K., & **Landi, N.** (2020). Gray matter structure is associated with reading skill in typically developing young readers. *Cerebral Cortex, 30*(10), 5449-5459.

Perrino, P. A., **Chamberlain, S.**, **Eigsti, I. M.,** & **Fitch, R. H.** (2021). Communication-related assessments in a mouse AS model. *Brain and Behavior, 11*(1), e01937.

Perrino, P., **Chamberlain, S.**, **Eigsti, I. M.**, & **Fitch, R.** (2020). Communication-related assessments in an Angelman syndrome mouse model. *Brain and Behavior, 00*. doi:10.1002/brb3.1937

Perrino, P. A., Daggula, K., Newbury, D., & **Fitch, R. H.** (2021). Peripheral anomalies in USH2A cause Central Auditory Anomalies in a Mouse Model of Usher syndrome and CAPD. *Genes, 12*(2), 151. doi: 10.3390/genes12020151. PMID: 33498833; PMCID: PMC7910880.

Schreglmann, S. R. et al. (2021). Non-invasive suppression of essential tremor via phase-locked disruption of its temporal coherence. *Nat Commun, 12*(1), 363. doi: 10.1038/s41467-020-20581-7.

Sklenarik, S., Potenza, M. N., Gola, M., & **Astur, R. S.** (2020). Approach bias for erotic stimuli among heterosexual female college students who use pornography. *Addict Behav*. Apr 16;108:106438. doi: 10.1016/j.addbeh.2020.106438. [Epub ahead of print] PubMed PMID: 32325387.

Snyder, W. (in press) A Parametric Approach to the Acquisition of Syntax. *Journal of Child Language*.

Tecoulesco, L., **Skoe, E.**, & **Naigles, L.** (2020). Phonetic Discrimination Mediates the Relationship between Auditory Brainstem Response Stability and Syntactic Performance. *Brain & Language, 208*, 104810. doi.org/10.1016/j.bandl.2020.104810

Xygalatas, D., Maňo, P., & Baranowski-Pinto, G. (2021). Ritualization increases the perceived efficacy of instrumental actions. *Cognition*, *215*, 104823.

Yang J. H., **Presby R. E.**, Cayer, S., Rotolo, R.A**., Perrino, P. A**, **Fitch, R. H.**, Correa, M., Chesler, E. J., **Salamone, J. D.** (2020). Effort-related decision making in humanized COMT mice: Effects of Val158Met polymorphisms and possible implications for negative symptoms in humans. *Pharmacol Biochem Behav, 196*, 172975. doi: 10.1016/j.pbb.2020.172975. Epub 2020 Jun 25. PMID: 32593787.

Zhai, X., Khatami, F., Sadeghi, M., He, F., **Read, H. L.**, **Stevenson, I. H.**, & **Escabi, M. A.** (2020). Distinct midbrain response statistics are associated with sound recognition and discrimination during the construction of natural sound textures. *PNAS, 117*(49), 31482-31493.

2.   *Peer Reviewed Journal Articles Directly Supported by IBACS, under review*

Davis, C. P., Paz-Alonso, P. M., **Altmann, G. T. M.**, & **Yee, E.** (under review). Encoding and Inhibition of Arbitrary Episodic Context with Abstract Concepts.

Giovannone, N. & **Theodore, R. M.** (Under review.) Contributions to individual differences in lexically guided perceptual learning.

Pejovic, J., **Yee, E.**, & Molnar, M. (under review). Infants' attention to the eyes during audiovisual vowel processing is altered by bilingual experience.

Wei, Y., **Mozeiko, J.**, & **Large, E. W.** (under review). Entrainment stability predicts melodic intonation therapy performance and reading fluency. *PNAS*.

Wang, S., Kido, Y., & **Snyder, W.** (under review) Acquisition of English Adjectival Resultatives: Support for the Compounding Parameter. *Language Acquisition*.

3.   *Book Chapters Directly Supported by IBACS*

Buck, R., Graham, B., **Allred, R. J.**, & **Hancock, R.** (2020). Nonverbal Receiving Ability as Emotional and Cognitive Empathy: Conceptualization and Measurement. In R. J. Sternberg and A. Kostić (Eds.), *Social Intelligence and Nonverbal Communication*. (pp. 21-49). Cham: Springer International Publishing.

Zhang, X. & **Santaniello, S.** (2021). Optimal and Adaptive Stimulation Design. in: Handbook of Neuroengineering. Editor: N.V. Thakor. *Springer Nature Singapore Pte Ltd*.

4.   *Conference Presentations and Abstracts Directly Supported by IBACS*

Grubb, S., Dalal, P., Daniel, J., Peraza-Santiago, G., **Luthra, S.**, **Saltzman, D**., Xie, B., **Crinnion, A. M.**, & **Magnuson, J. S.** (November, 2020). Talkers, time, tasks, and similarity in spoken word recognition. Psychonomic Society (Virtual).

Park, J., Satoshi, T., & **Sprouse, J.** (September, 2020). The sustained anterior negativity and syntactic movement dependencies in Korean. Talk presented at the 28TH Japanese/Korean Linguistics conference. University of Central Lancashire.

Parker, A., Parham. K., & **Skoe, E.** (September, 2020). Characterization of Serum Prestin as a Biomarker of Inner Ear Health [Conference presentation]. American Academy of Otolaryngology–Head and Neck Surgery, Boston, MA, United States (Virtual).

Parker, A., Parham. K., & **Skoe, E.** (January, 2020). Test-Retest Reliability of Serum Prestin Levels in Normal Hearing Young Adults [Conference presentation]. Association for Research in Otolaryngology, San Jose, CA, United States.

Parker, A., Parham. K., & **Skoe, E.** (April, 2020). Measuring Serum Prestin Levels in Normal Hearing [Conference presentation]. American Academy of Audiology, New Orleans, LA, United States (Virtual).

Peraza-Santiago[u], G., Beeson[u], K., **Luthra[g], S.**, **Saltzman[g], D.**, **Crinnion[g], A. M.**, & **Magnuson, J. S.** (November, 2020). Robust lexically-mediated compensation for coarticulation (LCfC) supports feedback in spoken word recognition. Psychonomic Society (Virtual).

Snyder, W. (2020), Children's syntax: A parametric approach (Keynote Address). In A. Botinis (ed.) Proceedings of 11th International Conference of Experimental Linguistics. Athens: ExLing Society.

B. INDIRECTLY SUPPORTED OUTPUTS

1. *Peer Reviewed Journal Articles Indirectly Supported by IBACS, published or in press*

Bar-On, D. (2021). Truth: Substantial and Undifferentiated, invited commentary on Strawson/Evans conversation about Truth (with Keith Simmons), online series (Huw Price, ed.)

Chen, H., **Read, H. L.**, & **Escabi, M. A.** (2019). A temporal integration mechanism enhances frequency selectivity of broadband inputs to inferior colliculus. *PLOS Biology*.

Davis, C. P., **Altmann, G. T. M.**, & **Yee, E.** (2020). Language as a mental travel guide. *Behavioral and Brain Sciences, 43*(125).

Davis, C. P. & **Yee, E.** (2021). Building semantic memory from distributional language and embodied experience. *pdf WIREs Cognitive Science*, e1555. https://doi.org/10.1002/wcs.1555

Fuhrmeister, P. & **Myers, E. B.** (2021). Structural neural correlates of individual differences in categorical perception. *Brain and Language*, *215*, 104919.

Gindina, S., Botsford, B., Cowansage, K., LeDoux, J., Klann, E., Hoeffer, C., & **Ostroff, L.** (2021). Upregulation of eIF4E, but not other translation initiation factors, in dendritic spines during memory formation. *J Comp Neurol, 529*(11), 3112-3126. doi: 10.1002/cne.25158. Epub 2021 Apr 27. PMID: 33864263; PMCID: PMC8165027.

Hou, B. et al. (2021). Loss of KCNQ2 or KCNQ3 Leads to Multifocal Time-Varying Activity in the Neonatal Forebrain Ex Vivo. *eNeuro, 8*(3), pp. ENEURO.0024-21.2021. doi: 10.1523/ENEURO.0024-21.2021.

Khatami, F. & **Escabi, M. A.** (2020). Spiking network optimized for word recognition in noise predicts auditory system hierarchy. *PLOS Computational Biology*.

Kim, J. C. & **Large, E. W.** (under review). Hebbian Plasticity in Gradient Frequency Neural Networks. *Biological Cybernetics, 115*(1), 43-57. doi:10.1007/s00422-020-00854-6.

Kim, J. C. & **Large, E. W.** (2021). Multifrequency Hebbian plasticity in coupled neural oscillators. *Biological Cybernetics, 115*, 43–57. https://doi.org/10.1007/s00422-020-00854-6

Lillo-Martin, D. & Henner, J. (2021). Acquisition of sign languages. *Annual Review of Linguistics, 7*, 395-419. https://doi.org/10.1146/annurev-linguistics-043020-092357

Luthra, S., **Li, M. Y. C.**, You, H., **Brodbeck, C.**, & **Magnuson, J. S.** (2021). Does signal reduction imply predictive coding in models of spoken word recognition? *Psychonomic Bulletin & Review*. https://doi.org/10.3758/s13423-021-01924-x

Luthra, S., **Magnuson, J. S.**, & **Myers, E. B.** (2020). Boosting lexical support does not enhance lexically guided perceptual learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*. Advance online publication. http://dx.doi.org/10.1037/xlm0000945

Luthra, S., **Mechtenberg, H.**, & **Myers, E. B.** (2021). Perceptual learning of multiple talkers requires additional exposure. *Attention, Perception, & Psychophysics*, 1-12.

Luthra, S., Peraza-Santiago, G., Beeson, K., **Saltzman, D.**, **Crinnion, A. M.**, & **Magnuson, J. S.** (2021). Robust lexically-mediated compensation for coarticulation: Christmash time is here again. *Cognitive Science, 45*, e12962. https://doi.org/10.1111/cogs.12962

Luthra, S., **Saltzman, D.**, **Myers, E. B.**, & **Magnuson, J. S.** (2021). Listener expectations and the perceptual accommodation of talker variability: A pre-registered replication. *Attention, Perception, & Psychophysics*. https://doi.org/10.3758/s13414-021-02317-x

Luthra, S., You, H., **Rueckl, J. G.**, & **Magnuson, J. S.** (2020). Friends in low-entropy places: Orthographic neighbor effects on visual word identification differ across letter positions. *Cognitive Science, 44*(12). ee12917. https://doi.org/10.1111/cogs.12917

Magnuson, J. S., Nusbaum, H. C., Akahane-Yamada, R., & **Saltzman, D.** (2021). Talker familiarity and the accommodation of talker variability. *Attention, Perception, & Psychophysics*. https://doi.org/10.3758/s13414-020-02203-y

Mascheretti, S., **Perdue, M. V.**, Feng, B., Andreola, C., Dionne, G., Jasińska, K. K., ... & **Landi, N.** (2021). From BDNF to reading: Neural activation and phonological processing as multiple mediators. *Behavioural Brain Research, 396*, 112859

Mechtenberg, H., Xie, X., & **Myers, E. B.** (2021). Sentence predictability modulates cortical response to phonetic ambiguity. *Brain and Language, 218*, 104959

Mickelsen, L. E., Flynn, W. F., Springer, K., Wilson, L., Beltrami, E. J., Bolisetty, M., Robson, P., & **Jackson, A. C.** (2020). Cellular taxonomy and spatial organization of the murine ventral posterior hypothalamus. *eLife, 9*, 58901.

Parker, A., Slack, C., & **Skoe, E.** (2020). Comparisons of auditory brainstem responses between a laboratory and home environment. *Journal of Speech, Language, and Hearing Sciences, 63*(11), 3877-3892.

Paul, M., Chemla, E., & **Sprouse, J.** (2020). The effect of three basic task features on the sensitivity of acceptability judgment tasks. *Glossa 5*, 1-23.

Pearl, L. & **Sprouse, J.** (2021). The acquisition of linking theories: A Tolerance Principle approach to learning UTAH and rUTAH. *Language Acquisition*.

Ren, N., Ito, S., Hafizi, H., Beggs, J. M., & **Stevenson, I. H.** (2020). Model-based detection of putative synaptic connections from spike recordings with latency and type constraints. *Journal of Neurophysiology, 124*(6), 1588-1604.

Sadeghi Najafabadi, M., Chen, L., Dutta, K., Norris, A., Feng, B., Schnupp, J. W. H., Rosskothen-Kuhl, N., **Read, H. L.**, & **Escabí, M. A.** (2020) Optimal Multichannel Artifact Prediction and Removal for Neural Stimulation and Brain Machine Interfaces. *Front. Neurosci, 14*, 709. doi: 10.3389/fnins.2020.00709

Sadeghi, M., Zhai, X., **Stevenson, I. H.,** & **Escabi, M. A.** (2020). A neural ensemble correlation code for sound category identification. *PLOS Biology*.

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2. *Peer Reviewed Journal Articles Indirectly Supported by IBACS, under review*

Bar-On, D. (under review). 'Pragmatics-First' Approaches to the Origins of Human Language.

Heffner, C. C., **Fuhrmeister, P.**, **Luthra, S.**, **Mechtenberg, H.**, **Saltzman, D.**, & **Myers, E. B.** (under review). Reliability for perceptual flexibility in speech: Identification, learning, and adaptation.

Parker, A., Parham, K., & **Skoe, E.** (under review). Noise exposure levels predict blood levels of the inner ear protein prestin. *Scientific Reports*.

3. *Book Chapters Indirectly Supported by IBACS*

Davis, C. P., **Yee, E.**, & **Eigsti, I. M.** (in press). Beyond the social domain: Autism-spectrum traits and the embodiment of manipulable object concepts. In S. L. Macrine & J. Fugate (Eds.), Movement matters: How embodied cognition informs teaching and learning. *MIT Press*.

4. *Conference Abstracts Indirectly Supported by IBACS:*

Luthra, S., Peraza-Santiago, G., **Saltzman, D.**, **Crinnion, A. M.,** & **Magnuson, J. S.** (2021). Lexically-mediated compensation for coarticulation in older adults. Proceedings of the 43rd Annual Conference of the Cognitive Science Society.

Shang Lin, L., **Troha, R.**, Hu, Q., Nadolny, R., Kuperstein, M., Mathew, N., Perumalla, S., **Stevenson, I., & Markus, E.** (May, 2021). Dorsal and ventral hippocampus remapping in response to novel experiences. International Behavioral Neuroscience Society remote conference.

Troha, R., Guy, A., Gowda, M., Patel, S., Perumulla, S., & **Markus, E.** (May, 2021). Hippocampal function in a changing aversive-appetitive environment. International Behavioral Neuroscience Society remote conference.

APPENDIX 8

UCONN | UNIVERSITY OF CONNECTICUT

CONNECTICUT INSTITUTE FOR THE BRAIN
AND COGNITIVE SCIENCES

Meet-and-Speak Event
Saturday, October 10th, 2020 via Zoom

*Note that * before a name indicates a pre-recorded talk*

9:30 AM	**Gerry Altmann,** Director, CT Institute for the Brain and Cognitive Sciences *Welcome*
9:40 AM	***Dean Juli Wade** *Opening remarks*
9:50 AM	***Eric Levine,** Neuroscience *Cellular effects of a common BDNF gene variant associated with altered cognition in humans*
10:00 AM	***Sharon Casavant,** Nursing *Predicting neurodevelopmental outcomes of preterm infants using absolute telomere length*
10:10 AM	***Sabato Santaniello,** Biomedical Engineering *Cerebellar stimulation and network-wide oscillations in essential tremor*
10:20 AM	***Linnaea Ostroff,** Physiology and Neurobiology *Synaptic pathways of fear and safety*
10:30 AM	***James Magnuson,** Psychological Sciences *Computational modeling of human speech recognition*
10:40 AM	**Questions – 10 minutes**
10:50 AM	*Break – 10 minutes*
11:00 AM	***John Salamone,** Psychological Sciences *Inflammation and effort-related motivational dysfunction in rat models: Implications for psychopathology*
11:10 AM	***Umay Suanda,** Psychological Sciences *How toddlers learn the meanings of words: A Statistical Learning approach*
11:20 AM	***Noelle Wig,** Speech, Language and hearing Sciences *A Dynamic Duo: Interaction between referential context and bilingualism in sentence processing*
11:30 AM	***Gerry Altmann,** Psychological Sciences *Representing events in deep neural networks*
11:40 AM	***Sandra Villata,** Linguistics & Psychological Sciences *An empirical investigation of ungrammatical sentence processing*
11:50 AM	**Questions – 10 minutes**
12:00 PM	*Break – 10 minutes*

Graduate Student Data Blitz (5 min talks)

12:10 PM	***Rama Ramasamy,** Neuroscience
	Urinary Pathophysiology of a Demyelination Model of Multiple Sclerosis
12:15 PM	***Lana Delasanta,** Psychological Sciences
	Analyzing group drumming using a Nonlinear Dynamics approach
12:20 PM	***Yi Wei,** Psychological Sciences
	Neural resonance to syncopated rhythms: Model predictions and experimental tests
12:25 PM	***Hannah Morrow,** Psychological Sciences
	Waves of Binding: EEG oscillations during integration of visual, auditory, and lexical stimuli
12:30 PM	***Briana Oshiro,** Mathematics
	A brief introduction to Dynamic Causal Modeling
12:35 PM	***Emily Yearling,** Psychological Sciences
	Using the past to understand the present: Insights into the episodic nature of tokenization
12:40 PM	***Aliyar Ozercan,** Philosophy
	Mental states and language development

12:45 PM	**Questions – 10 minutes**
12:55 PM	*Break – 5 minutes*
1:00 PM	**Panel Discussion** – featuring Whit Tabor, Holly Fitch, Sabato Santaniello, and John Gabrieli with Gerry Altmann as moderator
	Current directions, challenges, and opportunities in the brain and cognitive sciences
1:45 PM	*Break – 15 minutes*
2:00 PM	**Keynote Speaker – John Gabrieli, Director of the Martinos Imaging Center at the McGovern Institute, MIT**

Title: *Environmental Influences on Human Brain Development*

Abstract: Neuroimaging provides new views on how environmental factors influence human brain development. I will review findings about associations (1) among family socioeconomic status (SES), brain anatomy, and academic performance; (2) between early language experience and brain function and structure; and (3) between stress and brain function and how those can be altered by mindfulness training.