Interdisciplinarity at Duke:

A Brief Inventory of Connections among Schools and University-Wide Institutes, Initiatives, and Centers

February 2016 (Office of the Vice Provost for Interdisciplinary Studies)
Updated August 2018

For several decades, interdisciplinarity has been a hallmark priority at Duke. Since 2006, our university-wide institutes, initiatives, and centers (UICs) have pursued a deepening set of connections with Arts & Sciences, the Nicholas School of the Environment, the Pratt School of Engineering, the Sanford School of Public Policy, the Graduate School, the Schools of Medicine and Nursing, the Fuqua School of Business, and the Schools of Divinity and Law. The UICs have the related roles of **convening** new scholarly configurations, **catalyzing** new research agendas and pedagogical frameworks, and **connecting** faculty and students across disciplinary, divisional, and school boundaries. They also furnish an array of cross-cutting infrastructures that facilitate the work of faculty and students within schools. Thus these organizations supply university-wide public goods to Duke's many and varied intellectual communities.

The following overview discusses the linkages among UICs and Duke's schools, with regard to Duke's central missions of research, teaching, and societal engagement.

Research

UIC support for interdisciplinary research begins with considerable **logistical assistance**. In FY18, the UICs managed over $33 million in direct cost research expenditures for faculty across the university, including every school except Nursing. This portfolio generated $11 million in Facilities and Administrative payments that flowed to the School of the principal investigator[s]. (As a matter of policy, the UICs do not receive the so-called "indirects" associated with these grants). Several units, including the Franklin Humanities Institute (FHI), the Duke Institute for Brain Sciences (DIBS), and the Duke University Energy Initiative (DUEI), have put additional resources toward **pre-grant development**, through workshops to foster new collaborations and staff to assist with identifying grant opportunities and conceptualizing proposals.

UICs supply crucial **technical services and training** to faculty and students across Duke. The Center for Genomic and Computational Biology (GCB), for example, furnishes customized genetic sequencing for labs in the biological sciences, biomedical engineering, and the School of Medicine. The Social Science Research Institute (SSRI) offers solutions to data storage dilemmas, as well as privacy management services for sensitive data. Science & Society (S&S) provides intensive high-level training in science communications to faculty members, postdocs, and graduate students. Several UICs, including DGHI and DIBS, now offer workshops that focus on issues of diversity, inclusion, and power dynamics within their communities.

Some UICs similarly offer extensive **methodological training** to faculty and students. SSRI, for example, has a steady schedule of workshops on quantitative methods in the social sciences, as well as one-on-one training sessions and a forty-hour-a-week help-desk; it has also developed a set of workshops around the integration of qualitative and quantitative methods. The GCB Academy offers periodic intensive workshops that expose faculty, postdocs, and students to key concepts and techniques within the rapidly evolving domain of genomic science.

Every unit provides **administrative support, funding, space, and strategic advice** to a wide assortment of interdisciplinary centers, working groups, projects, labs, and scholarly networks. A majority of groups are led by tenure-track faculty whose tenure home resides in a department or a school; all of them have significant participation by school-based scholars. These collective endeavors range from the cluster of two to three-year Humanities Labs in the FHI, to the Religions and Public Life network sponsored by the Kenan Institute for Ethics (KIE), to large centers such as the Center for Cognitive Neuroscience (CCN) within DIBS, and the long-term research projects supported by the Duke Global Health Institute (DGHI), often with partners at field sites abroad.

The **intellectual communities** fostered by the UICs include the usual talks, lectures, seminar series, and roundtable discussions, which pull in faculty from every school. But they also reflect significant innovations for both individualistic and more collaborative scholarship. The FHI Faculty Book Manuscript Workshops fall into the first type of innovation. These gatherings involve a full day's discussion of an author's book manuscript, with an interdisciplinary group of faculty readers from Duke, two external scholars, and the acquisitions editor from the relevant

academic press. KIE has now begun its own manuscript workshops based on the FHI model; the university's Strategic Plan, *Together Duke*, provides funding to expand these workshops for Duke scholars working in disciplines that especially value the production of scholarly monographs.

Innovations involving collaborative research often revolve around **seed grant programs**. Incubator awards at DIBS ($400,000-$600,000 per year) have launched 41 interdisciplinary collaborations since 2007. DGHI has similarly provided significant travel and pilot grants (sometimes with a thematic focus, such as on global mental health) since its inception – with $835,000 going to thirty-six investigators from FY14 through FY18. More recently, DUEI, the Information Initiative (iiD), GCB, SSRI, the Innovation & Entrepreneurship Initiative (I&E), the Nicholas Institute for Environmental Policy Solutions (NIEPS), and KIE have all established seed grant programs.

Several such efforts have involved partnerships with other Duke UICs and/or Schools (e g., DUEI with iiD, Arts & Sciences, and Pratt). Collectively, these programs now distribute more than $1 million per year to support innovative interdisciplinary collaborations among Duke faculty; a growing number of these projects attract significant external grants (from both foundations and government agencies). In FY18 for example, Duke's Autism Center received a $12.5 million grant from the National Institutes of Health to continue research into the links between autism and Attention Deficit Disorder that began with a Bass Connections team and then received considerable additional funding from iiD and Duke's Office of Information Technology.

Over the last decade, a series of **joint hires and appointments between UICs and Schools** have deepened connections that give life to many of the above strategies and programs. (An Appendix furnishes an overview of these faculty appointments.)

Education

The role of UICs in undergraduate and graduate education has expanded greatly since 2010. Institutes and initiatives provide opportunities to administer (or create) programs that draw upon faculty from multiple Schools. From 2012 to 2017, **one undergraduate major and one co-major** were administered by UICs – Neuroscience (incubated by DIBS) and Global Health (run by DGHI) – each of which now attracts more than 90 students per class. (The remarkable success of the Neuroscience major led the Provost to move it into Psychology & Neuroscience, in order

**Education Programs
Administered by UICs**

Doctoral Programs
Cognitive Neuroscience Admitting Program
Computational Biology & Bioinformatics
Computational Media, Arts, & Cultures

Doctoral Certificates
Global Health

Masters Programs
Bioethics & Science Policy
Global Health
Interdisciplinary Data Science

Masters Concentrations
Energy & Environment

Undergraduate Majors
Neuroscience (moving to P&N)

Undergraduate Co-Majors
Global Health

Undergraduate Minors
Energy Engineering
Global Health
Neuroscience

Undergraduate Certificates
Decision Sciences
Energy & Environment
Ethics & Society
Human Rights
Innovation & Entrepreneurship
Science & Society

to facilitate the coordination of growing teaching demands). The DUEI administers the Energy Engineering minor for Pratt. **Six undergraduate certificate programs** are administered by UICs. S&S and I&E are responsible for the Science & Society and Innovation & Entrepreneurship certificates, respectively; DUEI oversees the Energy & Environment certificate, in conjunction with the Nicholas and Pratt Schools; and KIE runs an Ethics & Society certificate. FHI has launched a Human Rights certificate, while DIBS has started a Decision Sciences certificate, each attracting keen interest from students. UICs provide convening infrastructure and shoulder the administrative load for each of these programs.

Some UICs have also developed (or are exploring) educational collaborations with nearby educational institutions, or have developed summer programs to expand interdisciplinary research opportunities for undergraduates from underrepresented groups. Thus FHI has partnered with North Carolina Central University to create a Humanities Lab at NCCU; and along with Duke's Center for Applied Genomics and Precision Medicine, GCB has received an NIH grant to run a Summer Scholars Program, which brings minority students from around the country to Duke for an intensive research experience.

At the graduate level, DGHI runs Global Health masters degrees both in Durham and at Duke Kunshan University, as well as a Global Health doctoral certificate, while S&S oversees a Bioethics Masters (this program is evolving to encompass the ethical and policy issues raised by a host of scientific and technological contexts). In 2018, SSRI and iiD launched a new Masters degree in Interdisciplinary Data Science (MIDS), which immediately attracted intense interest from applicants around the globe. DUEI oversees the Energy & Environment Concentration for the Nicholas School's Masters in Environmental Management, while I&E is furnishing support for the Law School's Start-Up Ventures Clinic. Within DIBS, the CCN runs the Cognitive Neuroscience Admitting Program for doctoral students interested in the many disciplines within this domain of inquiry. GCB administers the Ph.D. program in Computational Biology and Bioinformatics, which draws half of its graduate students from departments in A&S and Engineering and about half from the School of Medicine. FHI is a convener of an interdisciplinary Ph.D. in Computational Media, Arts & Cultures, a joint endeavor with the A&S Departments of Literature and Art, Art History & Visual Studies.

Several UICs (DGHI, SSRI, KIE, FHI, NIEPS) **furnish additional interdisciplinary opportunities for graduate students** – chiefly the chance to interact with faculty mentors outside their discipline, integration in UIC seminars/events, research and travel grants, the facilitation of internship opportunities, and in some cases, partial stipends. FHI, for example, hosts a [Ph.D. Lab in Digital Knowledge](#) to assist graduate students who wish to bring information technology into their research toolkits; several Ph.D. students also play key roles in FHI Humanities Labs. DUEI and KIE create doctoral cohorts that share work in progress. I&E, moreover, has devised major business plan competitions for both undergraduate and graduate students and is developing a Graduate Certificate program. DGHI maintains a [Doctoral Scholars Program](#) that places a doctoral student on a research team with a mentor other than the main adviser, and offers substantial support for research in the field.

[**Bass Connections**](#) complements these curricular responsibilities and co-curricular modes of support. Five UICs oversee Bass Connections themes – DUEI has charge of [Energy & Environment](#) (with NIEPS faculty taking lead roles on several teams each year); DGHI of [Global Health](#); DIBS of [Brain & Society](#); iiD of [Information, Society, & Culture](#); and SSRI of [Education & Human Development](#). Each theme annually funds and advises approximately ten interdisciplinary, vertically-integrated research teams, collectively involving faculty and students across all ten Schools. The themes are also developing new gateway courses, inventorying related undergraduate classes, and providing intensive summer research experiences through iiD's [Data+](#), FHI's [Story+](#), and DGHI's [Student Research Training](#) teams. Although the courses associated with Bass Connections are primarily targeted at undergraduates, the research teams involve nearly 180 masters/professional students each year, of whom more than 30 are doctoral students; approximately 500 undergraduates now participate each year on a project team or in a summer research program.

Recent Examples of UIC Impact

[AI Detects Patterns of Gut Microbes for Cholera Risk](#)

[How DGHI Researchers Built Community Trust to Change Policy in the Peruvian Amazon](#)

[Energy Initiative Doctoral Student Fellow Receives Prestigious NBER Fellowship for Work on Battery Storage](#)

[The Role of Small-Scale Fisheries in Feeding the World](#)

[Duke Event Brings Together Researchers, Policymakers to Address Opioid Crisis](#)

[Math Tools Send Legislators Back to the Drawing Board](#)

[Harnessing the Power of Open Source Research and Teaching to Transform Education](#)

[Dynamic Learning Experience Prepares Undergraduates for What's Next](#)

[Seven Startups Snag 26 Investment Pledges at Demo Day](#)

Engagement/Outreach

Through the establishment of centers, field sites, and especially networks that include NGOs, industry, governmental officials, and other decision-makers, UICs have expanded the number of

platforms from which Duke faculty members can have an impact beyond academia. NIEPS has fashioned a **model of serving as a counselor to the policy process**, which other units have emulated. This approach depends on a process of anticipating the likely directions of policy agendas, and then investing in preliminary high-level research related to those pressing questions and issues. When NIEPS correctly identifies looming policy debates, it is well-positioned to offer timely analyses (whether about fisheries management, climate change regulation, water infrastructure, or other environmental concerns) to stakeholders. Even when the Institute offers such analysis through a bilateral relationship with a policy-making entity, it always makes its reports available to the public.

Within SSRI, the Global Value Chains Center has adopted a similar framework around global value chain analysis, which it furnishes to clients such as NGOs, development banks, and the governments of lower-income countries. S&S has an analogous undertaking around science policy in the United States, SciPol. This tracking website allows researchers, NGOs, firms, and citizens to remain abreast of state and national legislative or regulatory action concerning science, or dependent on scientific findings/analysis. SSRI is also cultivating several research projects around partnerships with local community organizations like Durham's Neighborhood Compass, including several that focus on education. Another SSRI affiliated unit, the Truth, Racial Healing, and Transformation Center, is partnering with community organizations and the City of Durham to heighten awareness of racial inequities and eradicate beliefs and practices that propagate racism.

At I&E and iiD, outreach targets **partners in the business world**. The former has rolled out an angel network that is expanding the supply of venture capital in the Triangle, and making that capital more available to entrepreneurial Duke students, faculty, and alumni. iiD is building relationships with a growing number of firms and NGOs that can serve as clients for either Data+ projects or Bass Connections teams. At DGHI, outreach encompasses businesses, government agencies, NGOs, and health facilities, all around the themes of developing new medical techniques, new approaches to healthcare and wellness, and new modes of delivering services within lower-income countries.

For FHI, KIE, and DIBS, outreach has focused on **public scholarship**. FHI and KIE pursue civic engagement centered on human rights, which for each has spawned DukeEngage projects. Both also support the **creation and dissemination of new digital data** (a key output for all the Humanities Labs, as well as Rethinking Regulation's oral history project). For DIBS, a key goal has been community outreach through public events such as science cafes that seek to explain recent scientific findings to a broad audience.

Finally, a growing number of Bass Connections teams are working closely with partners outside Duke. These range from corporations (assessment of energy efficiency at a glass manufacturing plant) to NGO-school partnerships (evaluating the impact of a music therapy program on social behavior among autistic middle-school students) to government agencies (provision of data on the health impacts of illegal gold-mining to the Peruvian Ministry of Health).

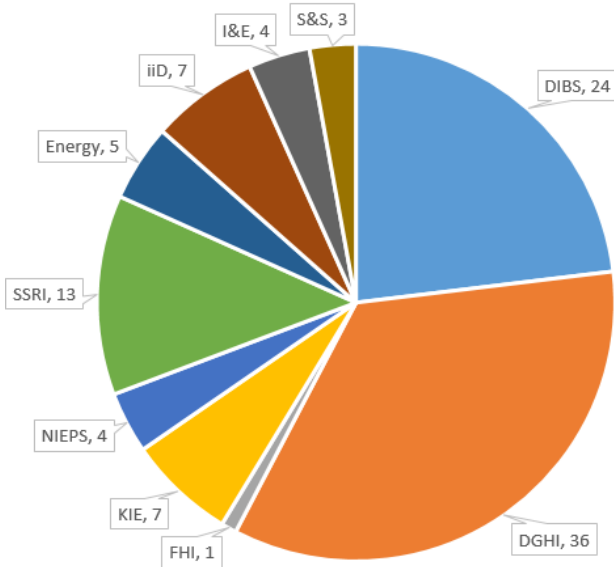   *   *   *   *

This brief overview, we hope, conveys at least a flavor of the myriad collaborations that link UICs with one another, with the faculty and students within Duke's schools, and with scholars and community organizations beyond Duke. Collectively, all the seed grants, workshops, projects, degree programs, seminar series, and networks constitute a remarkably dense web of interconnected interdisciplinary communities. Our [Interdisciplinary Studies website](#) offers more information and a rich array of stories and news pieces, as do the individual websites of the UICs.

Appendix: "Joint" UIC-School appointments (104 total; as of beginning FY17)

…by UIC:

- S&S, 3
- I&E, 4
- iiD, 7
- Energy, 5
- SSRI, 13
- NIEPS, 4
- KIE, 7
- FHI, 1
- DGHI, 36
- DIBS, 24

…and by school:

- Divinity, 1
- NSOE, 6
- Pratt, 6
- A&S, 40
- Law, 1
- Fuqua, 3
- SSPP, 9
- SOM, 38