

Graduate Student Training Enhancement Grants (GSTEG)

2018-2019 SUMMARY REPORT



Background

Together Duke, the university's strategic plan, includes a goal to [provide a transformative educational experience for all students](#) and sets forth increased opportunities for graduate and professional school students to prepare for a wide array of career options.

Duke's [Graduate Student Training Enhancement Grants \(GSTEG\)](#) program supports doctoral and master's students to stretch beyond their core disciplinary training and deepen preparation for academic positions and other career trajectories.

A [January 2018 RFP](#) invited all current Duke graduate students to propose training enhancement activities lasting up to one semester during the 2018-2019 academic year. Proposals were reviewed by a panel of faculty and graduate students from across the university.

2018-2019 GSTEG Recipients

Fourteen students [received grants for use in 2018-2019](#). Their graduate programs are housed in Arts & Sciences (7 students), Nicholas School of the Environment (4), Law (1), Nursing (1), and Pratt School of Engineering (1). Thirteen are Ph.D. students; one is pursuing her S.J.D. The average award was \$3,254.

Student	Program	Use of Grant	Faculty Mentor(s)
ARTS & SCIENCES			
Torang Asadi	Ph.D. in Religion	Human computer interaction and user experience research courses at UC-Berkeley, Coursera, and Stanford	David Morgan
Christina Bejjani	Ph.D. in Psychology and Neuroscience	Computational Summer School at University of Amsterdam	Tobias Egner
Yanyou Chen	Ph.D. in Economics	Railway Operations module of Railway Executive Development Program at Michigan State University	Christopher Timmins
Gray Kidd	Ph.D. in History	Professional training in the production of documentary films in Recife, Brazil	John D. French
Zachary Levine	Ph.D. in Cultural Anthropology	Plant medicine course at <i>Jardim Botânico</i> in Rio de Janeiro, Brazil	Diane M. Nelson
Adrian Linden-High	Ph.D. in Classical Studies	International Image Interoperability Framework workshop at University of Victoria, Canada	Mary T. Boatwright
Julia Notar	Ph.D. in Biology	Sensory ecology course at Lund University, Sweden	Sönke Johnsen
SCHOOL OF LAW			
Christine Ryan	S.J.D. in Law	Fieldwork on role of international human rights law in access to abortion in Kenya	Katharine T. Bartlett
NICHOLAS SCHOOL OF THE ENVIRONMENT			
Patrick Gray	Ph.D. in Marine Science and Conservation	Collaboration with Conservation Metrics in Santa Cruz; Marine Technology Glider Camp, Rutgers University	David W. Johnston

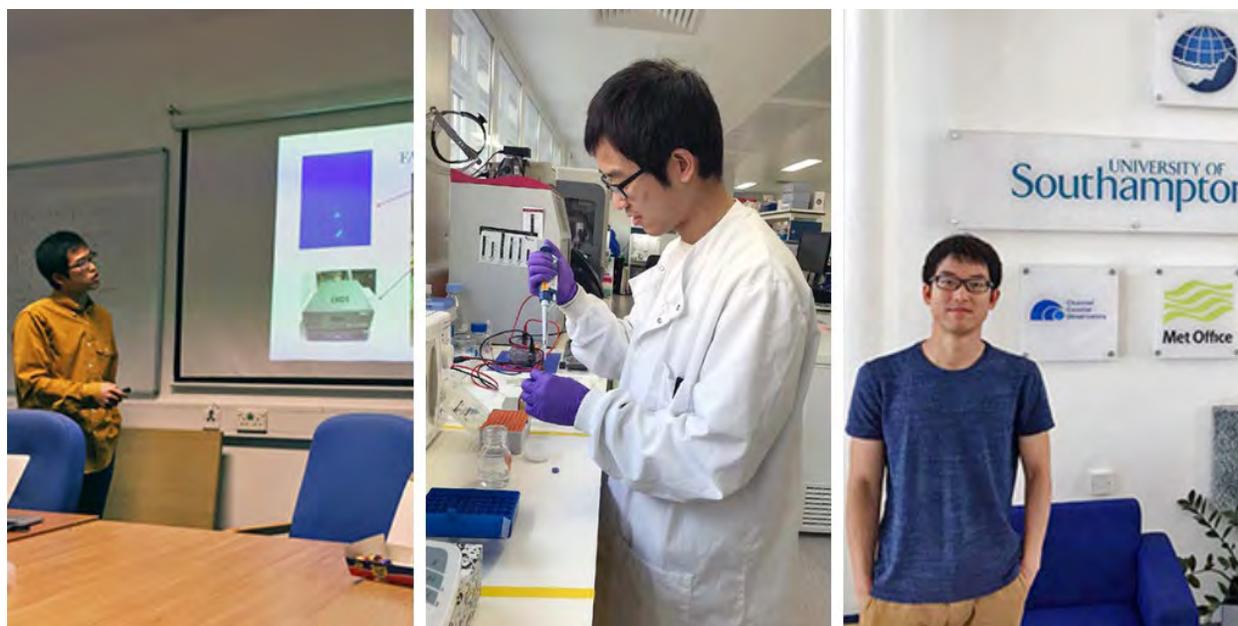
Student	Program	Use of Grant	Faculty Mentor(s)
Hillary Smith	Ph.D. in Marine Science and Conservation	Fisheries and Aquaculture Department fellowship at UN Food and Agriculture Organization in Rome, Italy	Xavier Basurto
Weiyi Tang	Ph.D. in Earth and Ocean Sciences	Collaboration with Dr. Julie Robidart's laboratory at National Oceanography Centre in Southampton, UK	Nicolas Cassar
Phillip Turner	Ph.D. in Marine Science and Conservation	Collaboration with International Seabed Authority (ISA) in Kingston, Jamaica	Cindy Lee Van Dover
SCHOOL OF NURSING			
Morine Cebert	Ph.D. in Nursing	Three courses at Odum Institute's Qualitative Research Summer Intensive at UNC-Chapel Hill and online Nurse Certificate Course for Reproductive Endocrinology and Infertility	Rosa M. Gonzalez-Guarda and Eleanor Stevenson
PRATT SCHOOL OF ENGINEERING			
Siddharth Kawadiya	Ph.D in Civil and Environmental Engineering	Internship at Firmenich in Geneva, Switzerland	Marc A. Deshusses

Types of Grant Activities and Examples of Impact

Hands-on Training

Weiyi Tang, Ph.D. in Earth and Ocean Sciences

Characterizing Diazotrophs in the North Atlantic Ocean with New Skills in Molecular Biology



My dissertation work explores marine nitrogen fixation, which is a key process controlling marine productivity, through statistical modeling, high-resolution observations and molecular level

characterization. With the support from the Graduate Student Training Enhancement Grant (GSTEG), I had the opportunity to visit Dr. Julie Robidart's laboratory to work on the molecular level characterization in National Oceanography Centre in Southampton (NOCS, UK) from March to June 2018.

During my visit to Dr. Robidart's lab, I was trained to identify the types of diazotrophs in the North Atlantic Ocean and explore how the microbial community influences nitrogen fixation. Specifically, I learned how to use quantitative polymerase chain reaction (qPCR) and reverse-transcription qPCR (RT-qPCR) to quantify the dominant diazotrophs species and their gene expression patterns. These results have been included in one chapter of my Ph.D. dissertation and in two scientific manuscripts in preparation.

Overall, this wonderful training experience has broadened my research scope in two ways. It moved my science forward in a way that would not be achievable at Duke, and it taught me skills that are invaluable to my graduate study and research career.

Patrick Gray, Ph.D. in Marine Science and Conservation
Combining Hands-On Marine Robotics Experience with Deep Learning Expertise



This grant facilitated a substantial amount of progress early in my Ph.D. and made an incredibly productive internship and rare fieldwork opportunity possible, both of which have guided me toward the midpoint of my Ph.D. This funding allowed me to further explore two of my core research interests: 1) incorporating artificial intelligence into environmental analysis; and 2) bridging ocean and planetary science.

As the first component of this grant, I spent two productive weeks with Conservation Metrics in Santa Cruz. This group focuses on using deep learning methods for analyzing large environmental datasets, and it was a place for me to immerse myself in intense software development alongside a brilliant and highly collaborative group of researchers in a similar field. This led to both the publication of a conference

paper, “Convolutional Neural Networks for Detecting Great Whales from Orbit in Multispectral Satellite Imagery,” and a published journal paper in *Methods in Ecology and Evolution* titled “[Drones and convolutional neural networks facilitate automated and accurate cetaceanspecies identification and photogrammetry.](#)”

This collaboration had begun virtually before we began working physically together through a project using deep learning to identify sea turtles in drone imagery, which was finalized while I was working in Santa Cruz and led to another paper with *Methods in Ecology and Evolution* titled “[A convolutional neural network for detecting sea turtles in drone imagery.](#)” I also wrote a [popular science article](#) for the *Methods in Ecology and Evolution* blog.

The second phase of this project, initially planned to fund an oceanographic glider workshop at Rutgers University, was changed because that workshop didn’t have sufficient attendance. My updated second phase was to join a [Texas A&M-led team](#) on a NASA Planetary Science and Technology for Analog Research (PSTAR) project to conduct coordinated drone and rover exploration over a Martian analog environment in Iceland. The objective of this work was to simulate the science operations of the Mars 2020 Rover, which will have a small drone for scouting out science targets. As a part of this fieldwork, I flew multispectral and topographic drone surveys, collecting data about our study sites, and simulating this new Martian aerial exploration vehicle that will guide the rover toward scientifically interesting areas and better assess the safety of the environment.

Gray Kidd, Ph.D. in History

Retreat from the Big House: Intellectuals and the Politics of ‘Culture’ in Recife, 1958-1987



In November and December 2018, I used my Graduate Student Training Enhancement Grant to produce a filmic component to my dissertation research. Guided by mentors at the Joaquim Nabuco Foundation (*Fundação Joaquim Nabuco, Fundaj*) in Recife, I developed a 20-minute long companion piece that drew on the institute’s remarkable collection of photographs, artworks, museum objects, films, and music.

Fundaj personnel generously allowed me to use their materials for this ambitious undertaking, with the understanding that I would donate a copy when my book project is published.

I used this “footstool companion,” which I call a “history in images” project, to stimulate responses from subjects during my oral history interviews. In spite of the intensifying political crisis in Brazil, I was able to show my film to seven subjects, who collectively offered nearly 13 hours of testimony. Most were intrigued by this novel form of storytelling.

Fundaj and I also organized a public event around this audiovisual project. We invited a wide range of locals, including university professors, teachers, graduate students, activists, and artists. Those who attended were generous in their feedback and raised a number of excellent points about my film. In fact, they pointed me in the direction of television archives that house period advertisements and the like. Four members of the institute’s oral history research team were in attendance and cleverly observed that they were learning as much about a foreign Brazilianist’s take as I was about native Brazilians’ understanding of the past. I am still thinking about this fascinating dialogue and how probing it further might lend itself to a coauthored article (myself and a Brazilian colleague).

Since returning from the field, I now understand that my “history in images” project is an important artefact of Brazil’s far-reaching sociopolitical crisis. My interviews offer a critique of the current impasse vis-à-vis reflections on the 1960s through 1980s. More specifically, this project shows how various kinds of historical actors see themselves in relation to 21 years of dictatorship and how to understand our arrival at the present crossroads. Again, I am interested in revisiting this research project from the vantage point of self-reflexivity to highlight the dialogic relationship between researcher, subjects, and politics.

Internships

Phillip Turner, Ph.D. in Marine Science and Conservation

The Middle Passage: An Area of Cultural Heritage on the International Seabed?

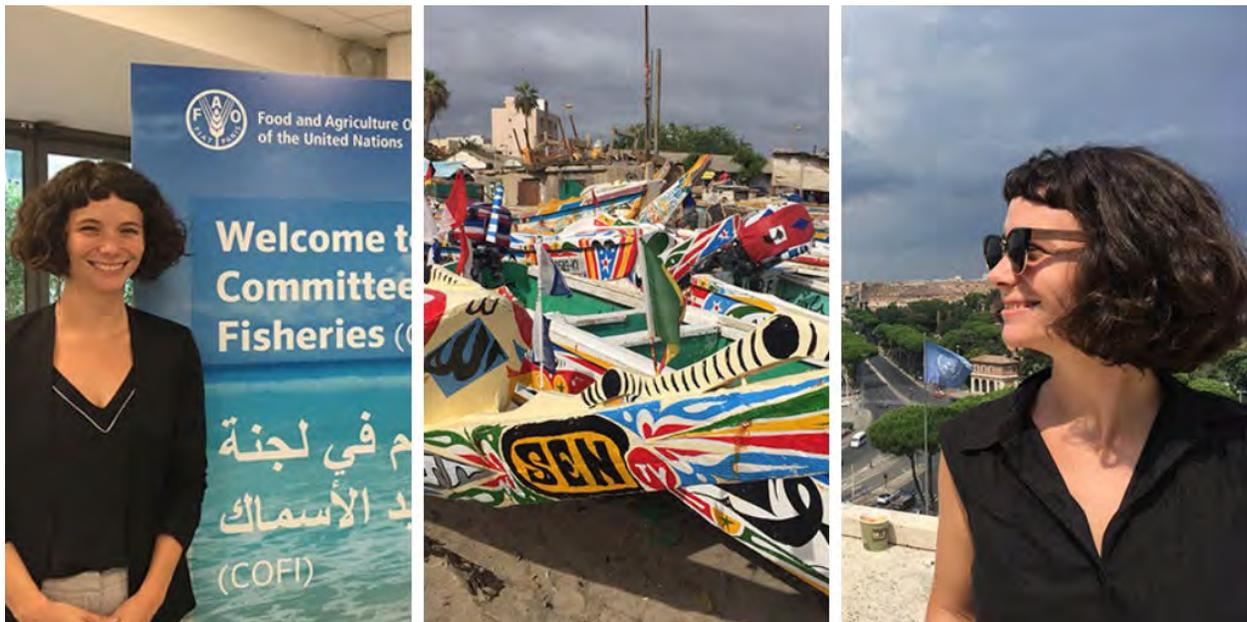


With the GSTEG award, I attended the 25th Session of the International Seabed Authority (ISA) in Kingston, Jamaica (February 25 – March 1, 2019). The ISA is an authority within the United Nations, which governs all deep-sea mining related activities on the international seabed. I was a member of the delegation for the [Deep Ocean Stewardship Initiative](#) (DOSI), which is a collection of deep-sea scientists, legal experts, economists, and other stakeholders that engage in deep-sea environmental management topics. Along with Dr. Diva Amon and Dr. Aline Jaeckel, I drafted four interventions outlining DOSI's position on different aspects of the draft regulations for deep-sea mining. We addressed the need for regional environmental management plans, clear exploitation standards and guidelines, and the importance of implementing the precautionary approach when considering environmental impacts. By drafting the interventions, I gained valuable experience in science communication. I was exposed to the language and form required to communicate science in a formal intergovernmental meeting, and gained practice discussing scientific concepts with State Party members from a variety of backgrounds.

During my time at the ISA, I was able to network with various deep-sea stakeholders and discuss the Middle Passage commemoration project. In this project, we ask the ISA to consider ways to commemorate the ~1.8 million enslaved Africans who died during slaving voyages across the Atlantic and came to rest on the Atlantic seabed. In Kingston, I discussed the project with representatives from Global Ocean Trust, Deep Sea Conservation Coalition, Pew Charitable Trust, the ISA's Legal and Technical Commission, and the Federated States of Micronesia. The project was positively received, and it will hopefully be discussed in more detail at subsequent ISA sessions, once the manuscript has been published.

Hillary Smith, Ph.D. in Marine Science and Conservation

Small-Scale Fisheries Governance Internship at the UN Food and Agriculture Organization



During my time as a fellow in the Fisheries and Aquaculture division of the Food and Agriculture Organization (FAO) in Rome, Italy, I was able to participate in global and regional policy fisheries processes that are relevant to my dissertation research. As an FAO fellow, I was able to participate in the

practical side of policymaking and gained a better understanding of the policy implementation process – an experience that is difficult to get as a student within the typical confines of a Ph.D. program.

At FAO, I attended the 33rd session of the UN Committee on Fisheries (COFI), the highest-level global fisheries meeting where UN member states set policy priorities and make public commitments to fulfill treaties and implement new initiatives. In addition to the opportunity to observe this global process, I worked alongside FAO staff to formally document the plenary session discussions and keep a record of member states’ commitments for the UN report. I also helped with the organization and running of side events during the meeting around key issues, including the future status and sustainability of small-scale fisheries.

After this global meeting concluded, I worked with FAO staff to help plan and implement a regional fisheries body meeting for Central and West African countries that share a maritime border. I traveled to Senegal on mission with FAO and helped facilitate the five-day workshop with participants from over 23 countries from across the sector to discuss regional and national priorities for a sustainable fishing sector in the region.

The workshop focused on how to implement the “Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries” – the first global UN policy tool specifically designed for small-scale fisheries. Part of my dissertation research focuses on how this policy tool is interpreted and implemented in practice, so witnessing the discussions and decision-making process around this policy tool firsthand was highly relevant to my research. At the workshop, I gave formal presentations and helped facilitate breakout working group discussion. I coauthored the [final FAO report from the regional workshop](#), which allowed me to practice and develop skills around writing policy reports.

Overall, my experience as a fellow at FAO enhanced my knowledge of global and regional fisheries policy processes relevant to my research and also gave me exposure to the applied side of fisheries research and policy. The relationships I cultivated while at FAO continue to open doors for my research, and hopefully, in my future career trajectory.

Courses

Torang Asadi, Ph.D. in Religion

Quantum Regimes: Holistic Healthcare among Iranians in Northern California



I received the GSTEG award for training in human-computer interaction (HCI) courses, since my dissertation project (Quantum Regimes: The Bodily Technologies of Holistic Healthcare) looks specifically at human-technology assemblages.

With the grant, I was able to travel to California for a few workshops and seminars in HCI and to register for courses with the Nielsen Norman Group. I took courses such as “The Human Mind and Usability,” “User Experience Research,” and “Design Thinking,” and I obtained the NN/g UX Certificate after passing the corresponding exams.

These activities were important for three main reasons. Primarily, this additional training allowed me to employ new and innovative research methodologies that greatly improved my project and gave me a new perspective with which to read my data. I was able to think more granularly about how technological design and use are intertwined with certain epistemologies, and even how the designers of our technologies are indirectly shaping ideas about health and the human body. The grant made me a much better social scientist.

Second, the training allowed me to rethink my pedagogy. I was better able to work with students from STEM and other technical fields, teach research methodology to my students, and help them translate their humanistic and social scientific skills into industry-specific traits that would open more doors for them. I believe this – the ability to teach a diverse body of students and train students in the humanities and social sciences for careers beyond academia – is going to make me a better candidate on the academic job market.

Third, the additional training and the UX certificate I obtained in the process have opened “alt-ac” doors for me. Through this training, I realized that my skills as a scholar of religion are extremely applicable, in fact highly desired, in the tech and design industries. Enhancing my social scientific research training with user experience research methodology recently enabled me to land a full-time job with Lenovo as a User Experience Researcher while I wait out the academic job market.

The generous dissertation fellowships, writing grants, and research grants we receive are a crucial part of how we survive and flourish as graduate students in the humanities. However, it was this small grant that single-handedly opened multiple professional doors for me and substantially shaped my career.

Zachary Levine, Ph.D. in Cultural Anthropology
Intensive Phytotherapy Course at Rio de Janeiro’s Botanical Garden



For six weekends I participated in a phytotherapy course at the stunning Botanical Gardens of Rio de Janeiro, Brazil. The course united pharmacists, nurses, herbalists, physical therapists, and me – an anthropologist studying plant medicine in the context of state incarceration. In my research, I study a prisoner healing NGO in Porto Velho, capital of the Brazilian-Amazonian state of Rondônia. At the NGO, a range of mind-body therapies – reiki, yoga, and ayurvedic massage, to name just a few – were supplemented a few years ago by an entheogen known as ayahuasca. During the program, a select group of state inmates was taken six hours outside of the prison to a center of the ayahuasca religion, Barquinha.

During the course, which took place from April to June 2018, I gained a deeper understanding of the ways that plants enter into medicinal contexts. I learned about the parts of plants that are used for therapeutic ends, and the many ways that these plant parts interact with different human systems (respiratory, circulatory, metabolic, etc.). I gained a deeper understanding of how plant medicines are classified and regulated and what governing bodies determine the norms and rules of their circulation. One of the major takeaways from the course was just how murky the line is dividing “folk” from “biomedical” uses of plant medicines. Nomenclatures may change, but patterns for using plant allies toward the healing of human bodies express a remarkable resilience across time.

One of the most notable experiences at the *Jardim Botânico* was a guided tour of the medicinal plants garden, which helped tie together the visual and sensory experience of being with plants, on the one hand, and the classificatory knowledge of plants and their human uses, on the other.

Overall, the experience in the medicinal plants garden and in the course more broadly was to remind me emphatically of something I already knew theoretically – that most plants are often lost in a realm of indistinction for many of us who grow up outside of contexts where plants are given more devotion and where their agency is central to human relations. Yet when one dives into these studies, one quickly realizes that a familiarity with plants has always run very deep in us; we have spent all our lives in their presence and care.



The module of railway operations held by Michigan State University is a five-day program in Chicago that covers the essentials of railway operations, both freight and passenger. The module combines classroom presentation of concepts with discussions led by rail industry subject matter experts, and with site visits to see the railroad in action.

Chicago is the capital of U.S. freight transportation. During our five-day program, we had discussions with industry experts from various fields, and we had site visits to learn the fundamentals of railway operations. For example, we visited the Chicago Area Consolidation Hub of UPS and the Burlington Northern Santa Fe (BNSF) Willow Springs Intermodal Ramp. The manager of UPS explained to us how the shipping price is negotiated between UPS and BNSF, and the yardmaster of BNSF demonstrated to us how shipments are picked up from UPS, loaded to trains, and sent out to their destinations.

We also visited the headquarters of TTX, where TTX Company is a provider of railcars and related freight car management services to the North American rail industry. The manager there explained to us how locomotive leasing and financing is conducted in this industry, and why financing cost is an important component of railroad operational expenses. What's more, I was offered the opportunity to speak with marketing director of Canadian National Railroad, where he explained to me what the practice of pricing is in this industry, and what factors affect the pricing decisions of railroad companies.

My dissertation studies cost efficiency and network complementarity following railroad mergers. To accurately quantify the magnitude of cost efficiency after mergers, I need to estimate railroad demand and capture the pricing decision of railroad companies in my economic model. By visiting the UPS consolidation hub and understanding how they negotiate shipping price with railroad companies, I learned which factors (including size of consumers, distance to the nearest intermodal terminal, etc.) are

important and need to be incorporated into my model to accurately capture the demand of freight transportation.

Furthermore, by visiting the TTX headquarters and talking to managers in different departments, I now understand how financing cost, market power, and competition affect the pricing decision. This is a very precious opportunity for me to observe how people actually do business and conduct operations in the industry, and to talk to industry experts in various fields including marketing, financing, and yard operations to understand what factors are important and need to be captured in an economic model.

This experience provided me with the necessary knowledge to understand this industry and enabled me to construct a reasonable economic model in quantifying the merger effects in American railroad industry.

*Christina Bejjani, Ph.D. in Psychology and Neuroscience
Computational Summer School*



As a part of my Graduate Student Training Enhancement Grant (GSTEG), I attended the [Model-based Neuroscience Summer School](#) at the University of Amsterdam. My goals were to develop computational skills that I can integrate into my graduate research, good coding practices that make large-scale data analysis reproducible, and relationships with leading researchers and my peers within cognitive neuroscience and the field of neuroscience at large. These goals were largely fulfilled by the program.

The summer school focused on providing participants with knowledge and hands-on experience in cognitive modeling across a wide variety of methodologies (evidence accumulation models like the drift diffusion model and linear ballistic accumulator and cognitive neuroscience analytic models) via lectures and practicals. These dynamic choice models typically allow us to understand how people make decisions and what factors they take into account during that process, and cognitive neuroscience models typically allow us to understand the neural mechanisms underlying cognition.

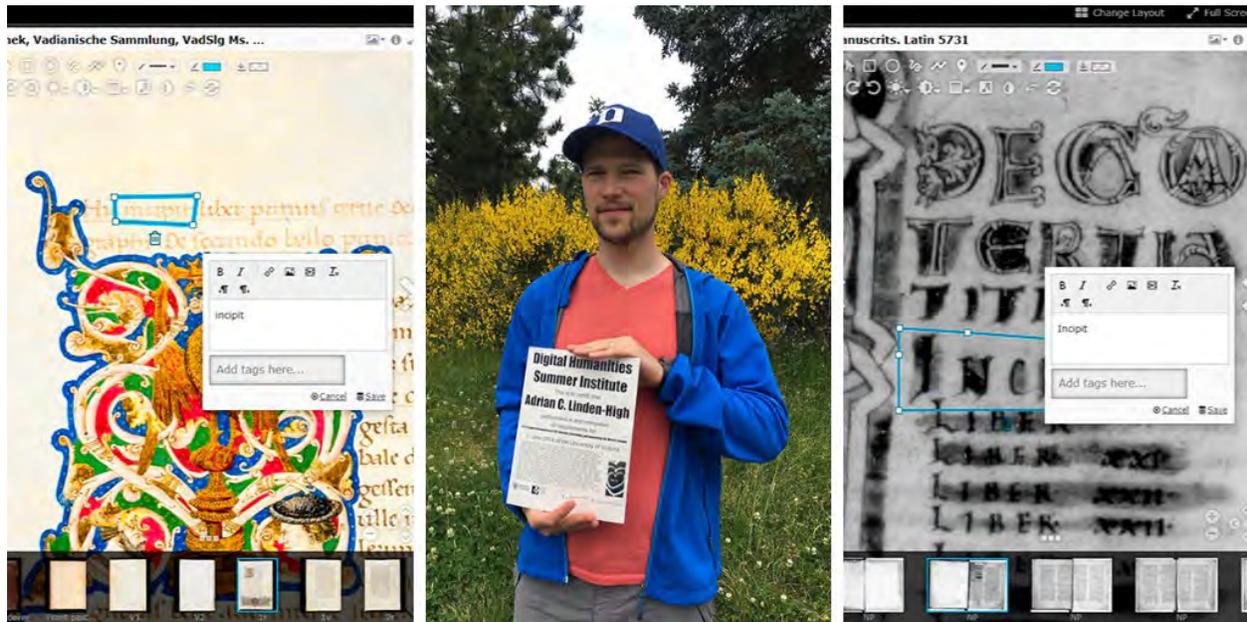
Early on in the program, I presented a poster on one of my current research projects and received feedback from one of the program organizers on how I could apply cognitive modeling techniques to enhance the data analysis for this project. After first introducing the basic principles of and approaches within model-based neuroscience and the particular cognitive models we would go over, the instructors then walked us through the particular scripts that we used to analyze datasets that they had provided. We learned how to estimate model fit for these evidence-accumulation models and how to sample data from different task participants. We applied coding skills in R within these practical sessions and now have scripts that we can use throughout the rest of our research careers. Finally, we moved onto cognitive neuroscience methods such as EEG and fMRI and how to adopt certain coding frameworks and practices within our analyses pipelines.

Having returned to Duke, I applied for a research grant that would allow me to apply the techniques I learned at this summer school to a new research project. I further plan to mentor an undergraduate on using these cognitive models so that we can uncover more about how people make decisions.

As for the networking component, the program was sufficiently small that I got to know several of my peers, and the poster session ensured that I got to talk with at least one expert on how to apply modeling to my research. Moreover, the program organizer suggested a small hangout on the last day as a program, allowing the attendees to chat with the lecturers in a less formal setting. I hope to continue discussing model-based perspectives with the organizers and my peers at future academic conferences, and I hope that the coding skills I learned will generalize to any career path I may take.

Adrian Linden-High, Ph.D. in Classical Studies

Unleashing the Power of Ultra High-Resolution Images in the Humanities



The five-day workshop I attended at the Digital Humanities Summer Institute in Victoria, Canada, was both intensive and rewarding. It focused on a new standard for displaying, sharing, and annotating ultra high-resolution images online called the International Image Interoperability Framework (IIIF). The team

of four instructors for the workshop included some of the leading developers of IIIF, such as Drew Winget and Jack Reed (both Stanford). They put together a superb blend of theory and practice. I left with a firm understanding of how IIIF works, what its goals are, and who would want to use it. I returned to Durham with a host of new ideas about how to use IIIF for my own research and teaching.

The major stakeholders currently pushing IIIF forward are libraries and museums interested in improving online accessibility of their holdings – mostly artwork, old maps, and manuscripts at this stage. While such institutions have been making their treasures available online for some time now, the diversity of infrastructures and the comparatively low quality used to deliver the images have hampered their effective use for research and teaching. IIIF is a big step forward since it allows users to compare and annotate side-by-side in a viewer images brought in from any institution using the new standard (see attached image). The resolution is practically unlimited thanks to a tiling technology similar to what is used for zooming in Google Maps.

The possibilities this opens for classicists are ground-breaking. For example, we can now reunite virtually on a canvas contiguous fragments of papyri and manuscripts that through the twists of history ended up in different collections. What is more, the extraordinary image resolution paired with an impressive array of annotation tools allows researchers to collaboratively study fragments of texts where a speck of ink might make a difference. Using annotations, we can now point to such specks and faint traces and discuss them with fellow specialists in other locations.

Though less heralded at this early stage in its development, IIIF promises to be beneficial for pedagogy as well. In fact, the course inspired me to build for the intermediate Latin class I taught in the fall of 2018 several IIIF-driven exercises using old maps and medieval manuscripts (see [examples](#)). Today's students crave interactive learning experiences, and with IIIF I learned a great way to provide them.

With its roughly 70 workshops and 1,000 participants, the Digital Humanities Summer Institute offers a smorgasbord-like experience to anyone interested in digital tools in the humanities. It hardly needs saying that this event offered countless networking opportunities. My favorite were the “Mystery Lunches” that allowed you to connect with people beyond your own workshop. I am very grateful for this instructive and motivating experience the GSTEG made possible!

Learn More

For more information, please visit the [GSTEG](#) page on our website or [contact](#) the Office of the Vice Provost for Interdisciplinary Studies (216 Allen Building, 919-684-1964, interdisciplinary@duke.edu).