

University of Delaware Data Science Institute

Data Science History

A campus-wide working group was formed in 2016 to foster data science research at the University of Delaware (UD). This working group organized a campus-wide Data Science Symposium where students, staff, and faculty discussed their research and education needs. In a white paper, the working group recommended creation of a Data Science Institute with cluster hiring to bring new expertise to the university.

The University of Delaware (UD) officially launched the Data Science Institute (DSI) on September 4, 2018. The DSI aims to accelerate research in data science, serving as a nucleating effort to catalyze interdisciplinary research collaborations across fields impacting our society. A working group recommended its creation and a related cluster hire. The initial funding for DSI was a \$650,000 grant from the UNIDEL foundation led by the UD Research Office and supported by all seven UD colleges.

The interdisciplinary cluster search was a key early success. It also served as the prototype for a UD effort to expand the size of the faculty through strategic cluster hires. The newly hired faculty were affiliated with two departments each, typically across college divisions, and serve as DSI Resident Faculty. Additional data science faculty were hired through departmental and college processes. There are now 13 DSI Resident Faculty and many more Affiliated Faculty. The DSI has four working groups on Research, Training, Infrastructure, and Networking & External Relations.

In parallel with these efforts, a new MS degree in Data Science (MSDS) was started as an interdisciplinary effort between three colleges. More on the history of this effort and the associated challenges and solutions can be found in the [2020 ADSA University of Delaware "successes and challenges" report](#) given by Prof. R.J. Braun, Director of the MSDS. UD now has 11 graduate, undergraduate and certificate programs with a major Data Science component and there are more than 40 data science or AI/Machine Learning courses taught by DSI faculty.

Successes and Challenges

The COVID-19 pandemic was a major crisis at UD as at other universities. Here the impacts were not just tight budgets and hiring freezes, but strong negative effects on the working conditions of individual faculty. A silver lining, perhaps, was the opportunity to contribute to our community's response. DSI Resident Faculty contributed modeling expertise to state agencies. Faculty hosted a webinar on COVID-19 Data Modeling and also organized a popular hackathon on COVID-19. (The graduate student government later organized their own Hackathon on Misinformation and Cybersecurity, which included some COVID-19 topics.)

This year, UD launched a new big data and high performance computing facility – the Delaware Advanced Research Workforce and Innovation Network (DARWIN), funded through an NSF MRI Team Science grant. A hiring freeze due to COVID-19 was a major challenge in commissioning this facility. We continue to advocate for new hires to support big data and high performance computing. As the facility comes online, a new challenge is developing a pricing model for our external partners.

Industry Engagement is a priority, ranging from local start-up firms to major financial companies. A dedicated, full-time industry liaison has been able to make considerable progress on a Corporate Affiliate Program and faculty have been engaged in these efforts. A challenge, however, is that the Government and Non-Profit Engagement so far often relies on individual relations. A major, challenging opportunity is developing educational/training programs that are suited to industry's needs. Here we see the traditional semester-long class is not ideal, and new classes and certificates are being developed. Faculty and department buy-in will be crucial.

The pandemic year did feature successful online activities. Besides the COVID-19 ones already mentioned, these included the inaugural UD Student Competition for Geospatial Data Visualization/Map Design, an annual DARWIN computing symposium, and the Virtual Symposium on Computational Social Science for an Inclusive Society. We hope to return to annual, in-person campus-wide Data Science Symposiums this fall. An online (Zoom) weekly Data Science Community Hour featured seminar topics selected by graduate students as well as discussions with data scientists in industry.

Integrating or coordinating the disparate data science educational efforts across campus is a challenge. UD recently founded a Graduate College. One of its goals is to serve as a home for interdisciplinary degrees, but it is too early to report on its success. Furthermore, it is unclear how an undergraduate “Data 8” style interdisciplinary class would work administratively at UD.

Looking forward to the post-pandemic era, we anticipate the return of the challenge of organizing in-person activities. To be sure, the Data Science and DARWIN Computing Symposiums attract hundreds of attendees, but these are rare events. While online Zoom meetings have drawbacks, they do allow relatively easy and broad participation. With DSI faculty and students scattered throughout different buildings across campus, in-person activities suffer from the travel time and inevitable scheduling conflicts. Finding the correct balance of online and in-person activities will be a challenge for 2021 and beyond.

A major ongoing challenge is keeping up faculty engagement. UD's campus culture is very department oriented, and individual departments have varying views of data science in their own strategic plans. Faculty may not feel an incentive to work on interdisciplinary, non-department work, especially when crucial DSI Resident Faculty are junior, pre-tenure faculty who will be evaluated by department committees. While some Resident Faculty negotiated for explicit language valuing DSI service in their offer letters, others did not have such contract language. Senior faculty too may drift to other activities and we have even lost highly engaged DSI working group leaders as they become College Deans or Department Chairs.