



THE UNIVERSITY OF
CHICAGO

Data Science Initiatives:
A Preview

UChicago Data Science Overview

- In keeping with our long tradition of pioneering new fields and defining new schools of thought, we have outlined a bold, innovative vision of **Data Science as a new discipline** that will one day take its place alongside the intellectual foundations of the Information Age, such as Computer Science, Statistics and Applied Mathematics.
- A joint venture **between the Department of Computer Science and Statistics**, the initiative's mission of use-inspired, data-centered research, and pedagogy will have an enduring influence on UChicago's educational ecosystem engaging with nearly every discipline of study.
- Our **unique focus on creating the foundational theories and approaches** for Data Science is driven by close engagement with real-world applications. This symbiotic relationship is the key to the University's approach to radically reorienting data-driven inquiry and impact across the breadth of human endeavor.

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DSI

EDUCATION

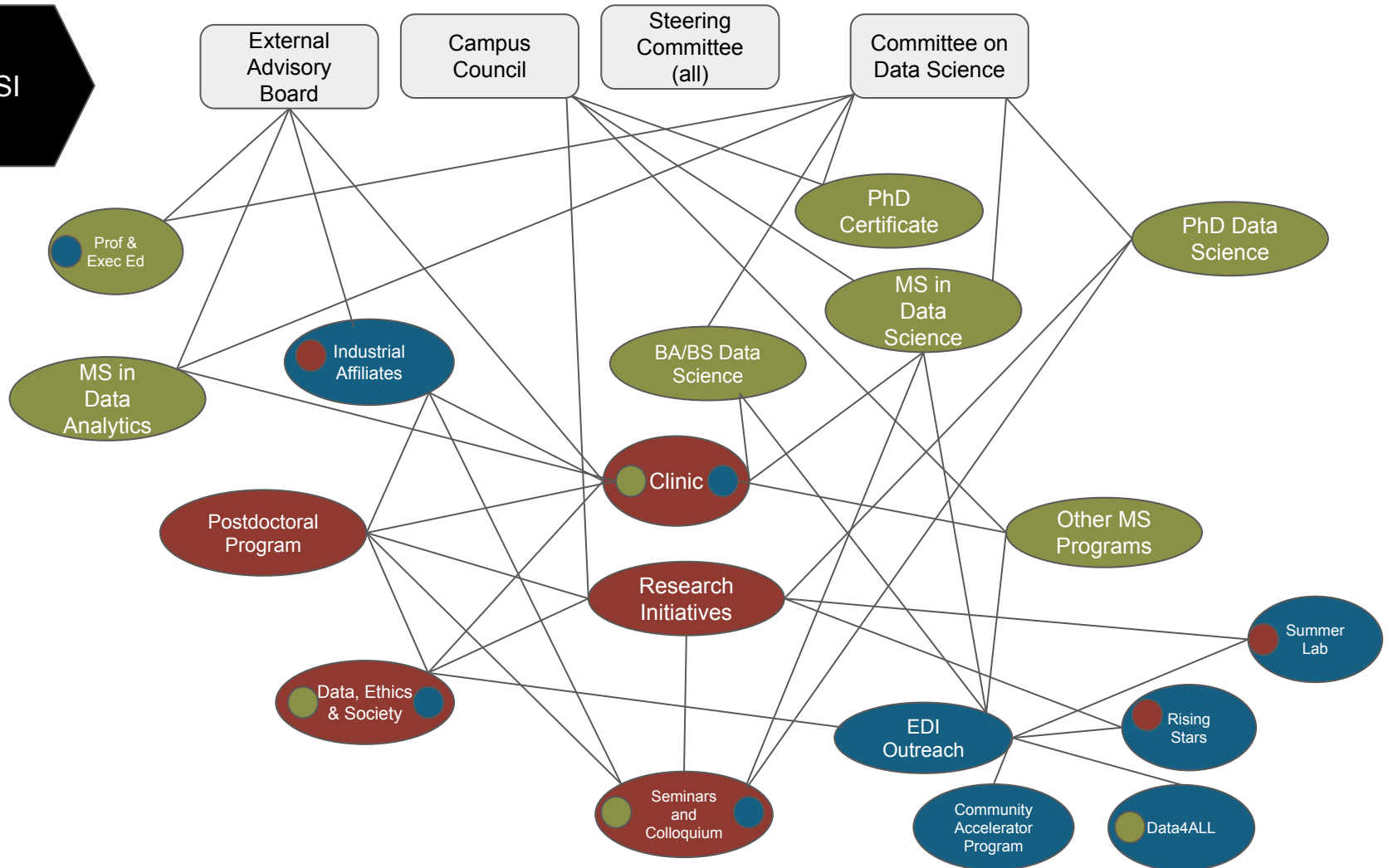
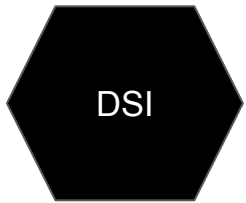
- Data Science minor and major
- MS and PhD in Data Science
- Professional and Executive Education

RESEARCH

- Multi-Year Research Initiatives
- High Risk/High Reward Seed Grants
- Postdoctoral Fellowship Program

OUTREACH

- Industry Partnerships and Clinic
- Equity, Diversity and Inclusion in DS
- Social Impact Programs



Education at a Glance

Near Term:

- Undergraduate Minor (Fall 2020) and Major in Data Science (Fall 2021)
- Supporting key Data adjacent or Data Centric programs:
CAPP, MScA, MACS, MPP, MS in Statistics, CAM
- Professional and Executive Education

Future DS Education Programs:

- PhD Certificate
- New Masters in Data Science
- PhD in Data Science

Education

New Data Science Major Summary

- New DS program leading to B.A. and B.S. degrees
- Curriculum covering foundational, theory, computation and applied data science
- Many new courses that will be taken not only by students interested in Data Science major or minor
- Required courses and many electives will be offered starting in Fall 2021:
 - **David Biron** - Director of Data Science Undergraduate Studies (Asst Senior Instructional Prof, Dept of Statistics)
 - **David Uminsky**, Executive Director, Data Science (coordinate Data Science Clinic)
 - **William Trimble** - Instructional Professor
 - TT Faculty in Data Science: **MF, DN, Chenhao Tan** (CS), **Victor Veitch** (Stats), **Aloni Cohen** (CS)
 - Ongoing search for Tenure Track faculty in Data Science (Depts of CS and Stats, joint appointments)

Goal: 1 in every 4 UChicago College student will engage in the Data Science minor and major.

Education

What is Clinic?

- Rigorous, high impact experiential learning
- In partnership with external industries (Partnership Model details included in Outreach slides), nonprofits, labs and research institutes
- Multidisciplinary and integrated across the undergraduate and graduate curriculum
- **Pilot:** Fall 20, Winter 21, Spring 21 - Civic Data & Technology Clinic (CAPP 30300, PPHA 30581, MACS 30300) 38 students worked on 12 projects with social impact organizations. “I love this course! I love that it is project-based. I feel like I have learned more in 2 weeks than in entire other quarters at Harris. This course also feels a million times more useful and applicable than other courses I’ve taken.”
- Expand Clinic to college concurrent with launch of BA/BS in DS (Fall 2021)
- Fermi project launched this week.

Education

Proposed Professional Ed Courses

Data Science and Machine Learning:

- Python for DS
- Data Engineering
- Statistics for DS
- ML and AI

ML Operations (Coming soon)

Data Science Postbac/Preparation for DS

- Statistics
- Matrix Math for ML
- Working with data
- Programming for Analytics

Education

Proposed Professional Ed Courses

Advanced DS and AI:

- Advanced Machine Learning Applications
- Deep Learning
- Architectures for AI and Data at Massive Scale
- AI and Data Science Capstone Experience

Data Privacy, Ethics and the Law for Data Science

- Consumer Privacy
- Digital Media Privacy
- Global Governmental Regulations, Criminal Activity and the Dark Web

Stand-alone:

Creating a Data-Driven Organization

Image Recognition

Outreach

Industry Partnership

- The Industry Affiliates Program connects industry partners to data science research, emerging technologies, and talent acquisition opportunities.
- The mission of the affiliates program is to lower barriers to collaboration and encourage mutually beneficial, long-term partnerships. Membership provides companies with access to the Data Science Clinic.
- Three Tiers of affiliation: Founding, Core and Key.

Outreach

Equity, Diversity and Inclusion

Current Programming:

- Rising Stars
- Summer Lab
- Data4ALL
- CCC Partnership

Planned Activities:

- DS outreach (BlackinAI, LXAI, QueerAI, MMW @ SACNAS, WiDS, WiML)
- UChicago outreach (student organizations, leadership alliance, Odyssey Scholars)
- Sloan Pathways Proposal with AUCC (Spelman, Morehouse, Clark Atlanta, Morehouse Medicine) Collaboration
- Mastercard Foundation Proposal w Howard, UIC and extendable to additional MSIs and HCBUs)
- Office of Civic Engagement Collaborations including Community Program Accelerator DS Curriculum (Data 101, 102 to build local social impact organizations data capacity)

Research at a glance

We propose a comprehensive four part research strategy, with significant coverage of depth and breadth, aimed to be uniquely effective for both expanding research bridges across many disciplines on campus, and for defining the field of Data Science.

This strategy includes:

- 1) multi-year research initiatives;
- 2) seed grants for high risk, high reward research projects;
- 3) developing a robust research ecosystem that can pursue and support strategic external funding opportunities
- 4) a robust postdoctoral fellowship program that both reinforces the success of 1) and 2) as well as serves as a foundation of independent and collaborative Data Science research for the entire DSI.

Research

Previous CDAC Successes

Partner & Scale

Over **\$1M** raised from private donors

Data.org \$1.2M Grant for high profile broadband access research project

Development of revenue generating programs:

- Professional Education
- Corporate Partnerships

Discover

Seed grants have submitted over **\$6.6M** in external grants

- 14 Publications/Conference Papers
- 2 prototypes/1 patent/ 1 startup founded

CDAC has supported over **\$63M** in data science-related grant submissions such as NSF AI Institutes

Training

Launch of Civic Technology Clinic, PIT-UN grant secured to hire clinic director

Development of ML for Cybersecurity certificate, supported by NSF EAGER award

4 postdocs recruited as data science scholars

Potential ACM and UC DSI Collaboration Avenues

- Collaboration on DS Curriculum
- Research collaboration/Sabbatical visits
- Pathways to graduate programs
- Summer Lab opportunities
- Grant and funding opportunities
- Blue sky?