


Faculty of Computing & Data Sciences

Vision, Mission, and Progress

Azer Bestavros


W. F. Warren Distinguished Professor of Computer Science
Associate Provost for Computing & Data Sciences

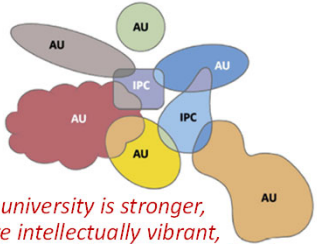


April 2022

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Data Science at BU: Decades in the making





“The university is stronger, more intellectually vibrant, and more able to adapt to the changing world if disciplines are integrated and interconnected with each other.”

Robert A. Brown (April 2018)

Key Milestones

- **1983:** CS Department splits of Math Department
- **1988:** Program in Cognitive & Neural Systems goes live
- **1990:** Center for Computational Science is created
- **2009:** BU co-founds regional HPC data center with MIT, Harvard, U Mass, and NU
- **2011:** Hariri Institute for Computing is created as an incubator for data-driven research
- **2014:** Provost launches the Data Science Initiative to grow faculty in DS
- **2018:** BU announces plans for the new building for Computing & Data Sciences
- **2019:** Faculty of Computing & Data Sciences is created as new academic home for DS

BU COMPUTING & DATA SCIENCES

KEY MILESTONES

1993	Computer Science Degree Programs
1988	Cognitive & Neural Systems Program
1990	Computational Science Research Center
1995	Computer Engineering Degree Programs
2002	Center for Info & Systems Engineering
2005	RISCS Cybersecurity Research Center
2009	Massachusetts Green HPC Consortium
2011	Rafik B. Hariri Institute for Computing
2013	Mass Open Cloud Computing Initiative
2014	Software & Application Innovation Lab
2014	Provost Data Science Hiring Initiative
2015	MS in Statistical Practice Program
2016	Spark! Student Innovation in Computing
2017	Cyber Security, Law, and Society Alliance
2017	Artificial Intelligence Research Initiative
2018	MS in Artificial Intelligence Program
2018	Center for Computing & Data Sciences
2019	Faculty of Computing & Data Sciences

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The Center for Computing & Data Sciences

Move-in: November 4, 2022 / Ribbon Cutting: December 8, 2022


[Live Cam Views](#)




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The Center for Computing & Data Sciences

- Iconic 19 stories, 345,000 square feet of state-of-the-art classrooms, labs, and collaboration spaces at the heart of the Charles River Campus
- A major addition of prime campus space at the crossroads of the major corridors connecting key academic and residential centers of mass at BU
- Home for the CAS Departments of Computer Science and Mathematics & Statistics, and the Faculty of Computing & Data Sciences
- ➔ **A bold statement about BU's commitment to data-driven discovery & innovation and to the vibrant academic experience for its students**



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The Faculty of Computing & Data Sciences (CDS)

Launched Fall 2019

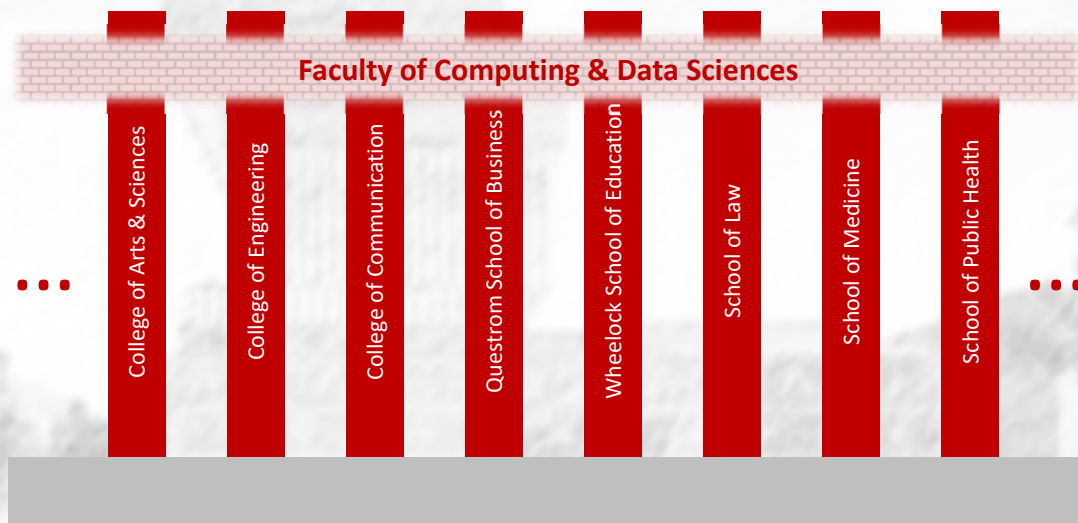
Molding the ivory tower into a public square

- New interdisciplinary, degree-granting academic unit with faculty members appointed in CDS and jointly across BU
 - Porous organization that augments and connects the traditional disciplines underlying computing & data sciences
- To democratize access by students, faculty, and organizations to data-driven innovation in computing & AI



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CDS: Molding the ivory tower into a public square



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CDS at a Glance: Academic Programs

Undergraduate Major in Data Science (launched Fall 2021, first matriculates by Fall 2022)

- Spiral approach for coverage of data science foundations (a.k.a. math on demand)
- Two pathways that equalize “methodological” and “in the field” tracks
- Degree as a base for a minor in another discipline (and vice versa)
- Focus on experiential learning and practicums (early and often)

Graduate PhD in Computing & Data Sciences (launched in 2020, first cohort started in Fall 2021)

- Holistic admission to increase intake from broader (non-CS) backgrounds
- Two-year cohort model with late-binding to build community and close skills gap
- Lab rotations to catalyze interdisciplinary research and industry engagement

Undergraduate Minor in Data Science (launching Spring 2022)

- Two pathways: Basics of DS for non-STEM vs Depth in DS for STEM students
- Designed to serve either as a ramp or exit for applied data science disciplines

Graduate Professional MS in Data Sciences (under development for launch by Fall 2023)

- MS in Data Science, MS in DS + X, joint programs (e.g., BA/MS, JD/PhD, ...), certificate programs

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Integrative Pedagogy: Spiral DS Curriculum at BU

Algorithms **Experiential**

Mathematics **Programming**

Fluency: Design and implementation of DS pipelines → **Major in Data Science**

Competency: Concepts, methods, and tools of DS → **Data Science + X Degrees**

Literacy: Basic programming and data analysis → **Minor in Data Science**

Appreciation: Critical thinking with data → **Ramp to Data Science**

Widening the DS Pipeline

- Motivated by real-world applications
- No presumed exposure to math or CS
- No detached/standalone prerequisites
- Integrated social and ethical considerations

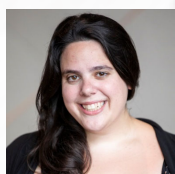
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CDS at a Glance: Faculty Growth & Areas

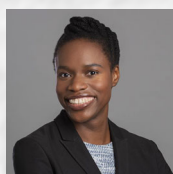
1. **DS in the Field:** Data mining, machine learning, and AI systems, which are inspired by concepts from, or address unique challenges in specific STEM fields. Examples:
 - Health & Biomedical Sciences: CompBio, Bioinformatics, Precision Medicine, *etc.*
 - Environmental & Sustainability Sciences: Smart Grids, Geospatial ML, Green Computing, *etc.*
 2. **Sociotechnical & Human-in-the Loop Systems:** Algorithms, protocols, and platforms that operate within legal, economic, and public policy frameworks. Examples:
 - Civic Tech: Secure/private/verifiable/trusted computing, countering mis/disinformation, *etc.*
 - Cognitive Computing: Mechanism Design, Meta Learning, Explainable/Fair ML, NLP, HCI, *etc.*
 3. **CDS Foundations:** Theoretical research at the interface of algorithms, information theory, optimization, mathematics, and statistics. Examples:
 - Computing at Scale: Streaming/Sublinear-time algorithms, compressive sensing, *etc.*
 - Learning Theory: Federated learning, causal inference, scientific ML, information theoretic ML, *etc.*
- + Clinical & Of the Practice Teaching Faculty** in data science, machine learning, and AI

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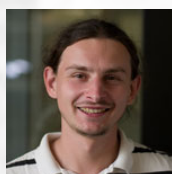
CDS: Faculty Members – Core



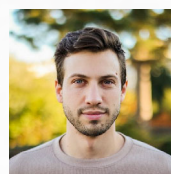
Kira Goldner (PhD'19)
U Washington, CS
TT Assistant Professor
Game Theory + Policy



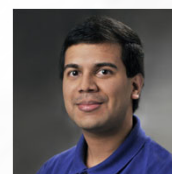
Ngozi Okidegbe (LLM'19)
Columbia Law
TT Assistant Professor
Law & Tech + Racial DS
(joint with Law School)



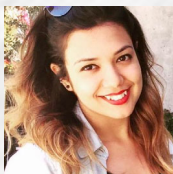
Krzysztof Onak (PhD'10)
MIT, EECS
TT Assistant Professor
Big Data Algorithmics



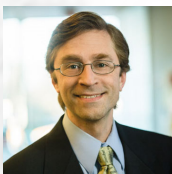
Pawel Przytycki (PhD'18)
Princeton, CS
TT Assistant Professor
Computational Biology



Mayank Varia (PhD'10)
MIT, Mathematics
Associate Professor
Cryptography + Law



Tanima Chatterjee (PhD'21)
U Illinois Chicago, CS
Clinical Assistant Prof.
Network Algorithms

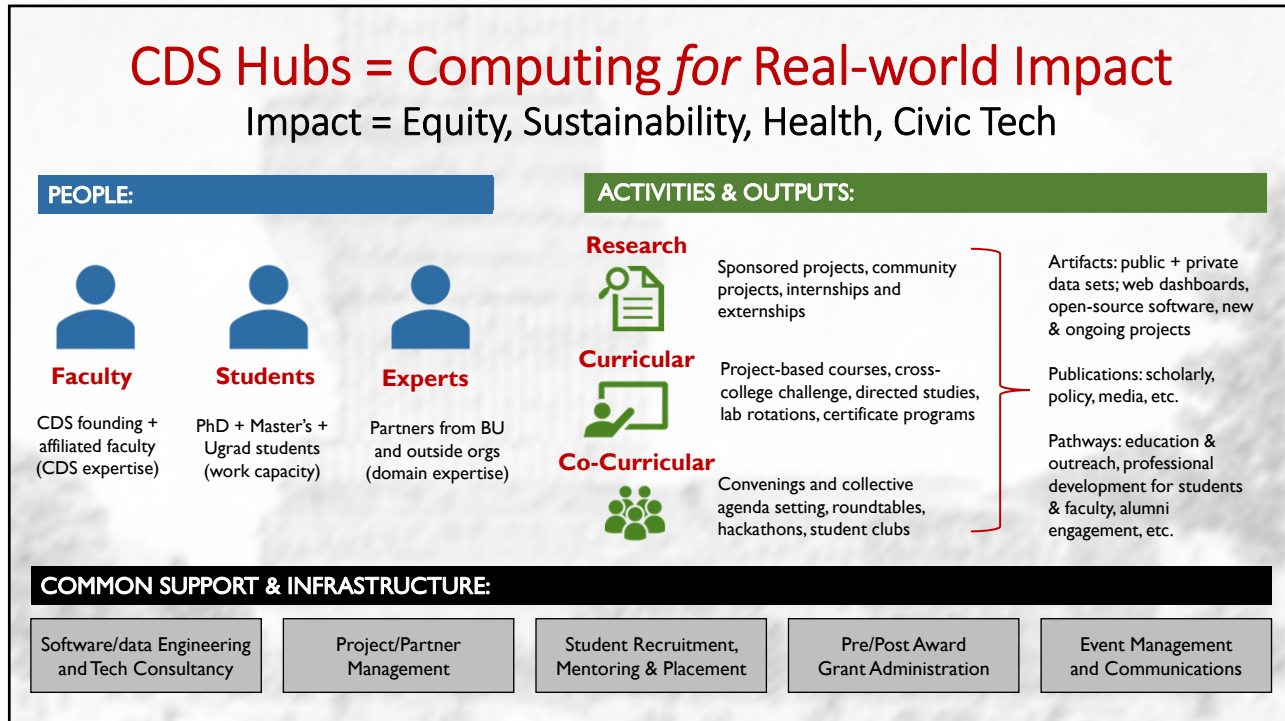


Kevin Gold (PhD'08)
Yale University, CS
Associate Prof. of the Practice
Machine Learning & AI



Langdon White (BS'97)
Siena College, CS
Clinical Assistant Prof.
Software Engineering

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CDS Hub for Civic Tech: Fellows

The CDS Civic Tech Fellows program amplifies the ongoing work and impact of faculty, postdoctoral researchers, and practicing experts at the intersection of technology and public interest.



Lei Guo
(COM)



Gabe Kaptchuk
(CS/CAS)



Michelle Johnson
(COM)



Max Palmer
(PoliSci/CAS)



Andrew Sellars
(LAW)



Gianluca Stringhini
(ECE/ENG)



Derry Wijaya
(CS/CAS)





Brooke Williams
(COM)

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Justice Media & Computational Journalism co-Lab

COLLABORATING ENTITIES:

-  Boston University Faculty of Computing & Data Sciences
-  Boston University College of Communication

PARTNERS:



ACTIVITIES:

Curricular



- XCC 433: Justice Media Computational Journalism Course
 - CDS/ CS/CE/ COM Students
 - 4 Hub Units (Writing Intensive)
 - Investigative computational journalism projects with partners

Co-Curricular



- Curricular and Co-Curricular: Data Science and ML Projects (2018-2020)
 - Federal prosecutorial misconduct (The Intercept)
 - State procurement contracts & Black businesses (WGBH)
 - Police Payroll (WGBH)
 - Police campaign contributions (The Globe & Banner)
 - Real Estate in Boston's Minority Neighborhoods (Baystate Banner)

Co-Curricular: Summer Bootcamp & Externship Program (Summer 2020)

Research



Research: Racial bias in media coverage (AIEM, WGBH, NAACP)

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Powered by BU SPARK!

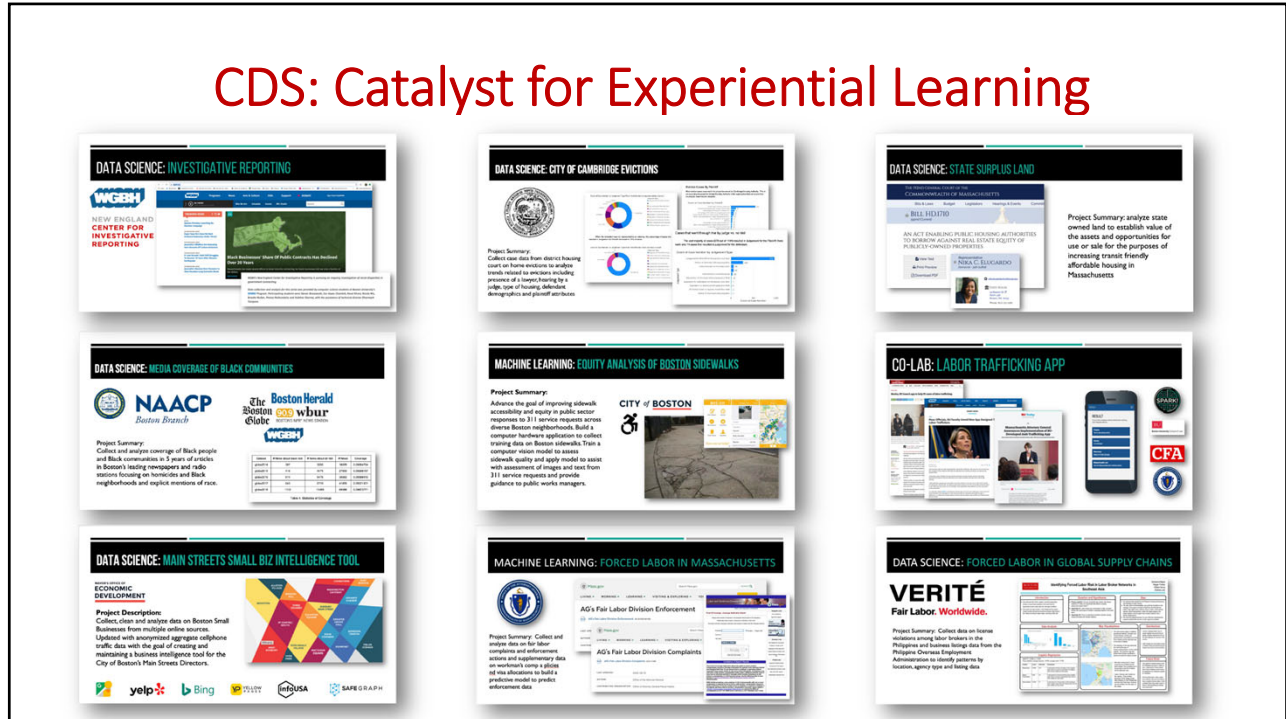
Building community, supporting student-driven innovation and experiential learning opportunities in computing & data sciences



1,900+ students **538** semester-long projects since **2017**

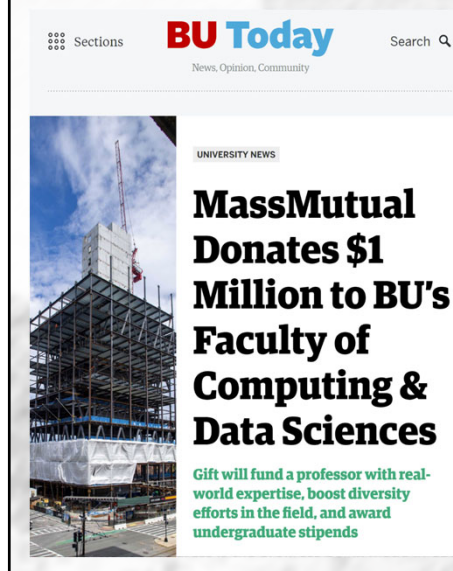
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CDS: Catalyst for Experiential Learning



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CDS: Catalyst for New Industry Collaborations



"BU is standing up a phenomenal new center for computing and data science. Its students have skills, knowledge, and experience that can benefit our growth as well."

– Adam Fox, Head of Data at MassMutual



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CDS: Vibrant Experiences & Impact

LOCAL

▶ The Color Of Public Money: Black Businesses' Share Of Public Contracts Has Declined Over 20 Years

Gonzalo Rosales (CAS'21 → Google)

GBH Investigations @GBHNewsCIR
 It is worth noting: Our Color of Public Money series began with a data collaboration with @bu_spark students... our codename was "crab" because we asked them to crack open a closed state database to scoop out the data. This project would not have launched w/o them.

Singer @singernews · May 6
 Exceptionally proud of our newsroom today - 6 regional Murrow awards including Overall Excellence, Investigations (@jbmckim on Parole) and new DEI category for the Color of Public Money (@burrell_wgbh @phillipWGBH @KirkCarapezza) twitter.com/RTDNA/status/1...

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CDS: Vibrant Experiences & Impact

LOCAL

▶ The Color Of Public Money: Black Businesses' Share Of Public Contracts Has Declined Over 20 Years

Gonzalo Rosales (CAS'21 → Google)

“Growing up with a single, immigrant mother who didn't speak English, I knew that I loved computers and technology, but was never able to actually know what the work would be like, or could even feel like I belonged, because no one in my family held a job like this. The [JM co-Lab project] I've worked on helped me not just grow my skills, but also catch up with my peers that perhaps had engineers in their families that they could look up to. I want you to know that you're impacting the lives of students like me in ways that you can't imagine, so I felt like writing to you and expressing my heartfelt thanks.”

including Overall Excellence, Investigations (@burrell_wgbh @phillipWGBH @KirkCarapezza) twitter.com/RTDNA/status/1...

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