Introduction to Statistics and Data Science, at MIT

Devavrat Shah
Director, Statistics and Data Science Center (SDSC)
Institute for Data, Systems and Society (IDSS)
Professor, EECS
Massachusetts Institute of Technology

IDSS

stat.mit.edu

MIT STATISTICS + DATA SCIENCE CENTER

Statistics and Data Science Center (SDSC)

Academic Center

Within the Institute for Data, Systems and Society (IDSS)

MIT-wide focal point for advancing

Academic Programs

Research Activities

in Statistics and Data Science

by providing a common umbrella for everyone across campus

A "humble" goal:

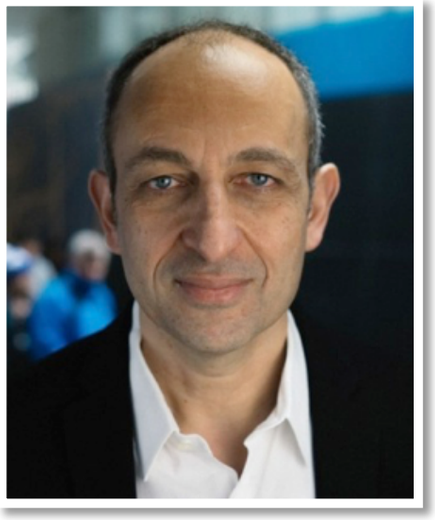
be a leader of 21st century Statistics and Data Science

IDSS

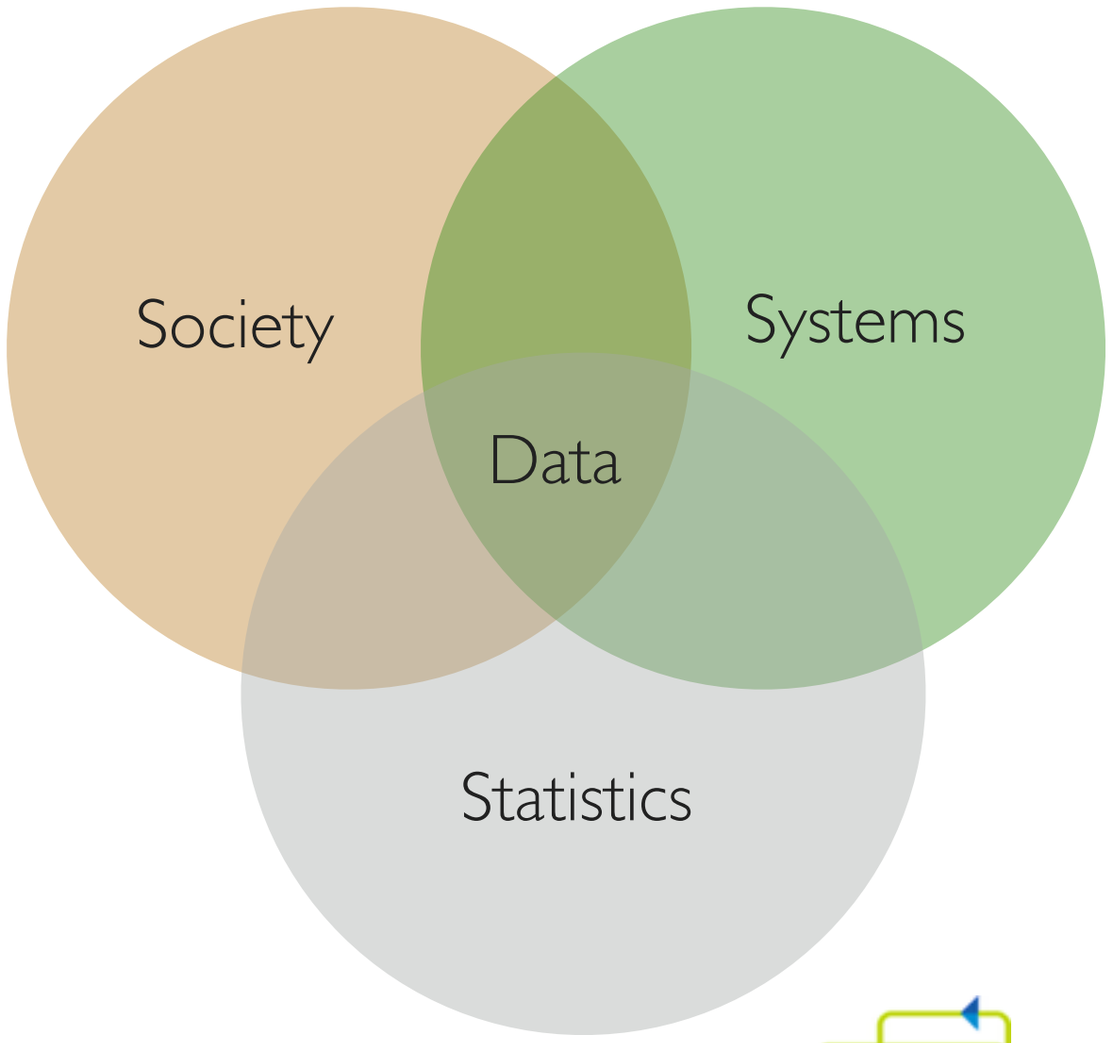
LIDS MIT STATISTICS + DATA SCIENCE CENTER

Institute for Data, Systems and Society (IDSS)

*"Address **complex societal challenges** by advancing education and research at the intersection of **statistics, data science, information** and **decision systems**, and **social sciences**."*



Munzer Dahleh, Director



IDSS

LIDS

MIT STATISTICS + DATA SCIENCE CENTER

Who We Are

ALBERTO ABADIE

Professor, Economics

GUY BRESLER

Bonnie and Marty Tenenbaum Career Development Assistant Professor, Electrical

TAMARA BRODERICK

ITT Career Development Assistant Professor, Electrical Engineering and Computer Science

EMERY BROWN

Edward Hood Taplin Professor, Brain & Cognitive Sciences

VICTOR CHERNOZHUKOV

Professor, Economics

ELCHANAN MOSSEL

Professor, Mathematics

WHITNEY NEWEY

Jane Berkowitz Carlton and Dennis William Carlton Professor of Economics and Department

ALEXANDER (SASHA) RAKHLIN

Associate Professor, Brain & Cognitive Sciences

PHILIPPE RIGOLLET

Associate Professor, Mathematics

DEVAVRAT SHAH

Director, Center for Statistics and Data Science, Professor, Electrical Engineering and

DAVID GAMARNIK

Professor, Operations Research, Sloan School of Management

STEFANIE JEGELKA

X-Consortium Career Development Assistant Professor, Electrical Engineering and

RAHUL MAZUMDER

Assistant Professor, Sloan School of Management

ANNA MIKUSHEVA

Associate Professor, Economics

ANKUR MOITRA

Rockwell International Career Development Assistant Professor, Mathematics

SUVRIT SRA

Assistant Professor, EECS

CAROLINE UHLER

Henry L. & Grace Doherty Assistant Professor, Ocean Utilization; Electrical

ROY E. WELSCH

Professor of Statistics and Management Science, Sloan School of Management

CORE Members from ALL schools of MIT

(20+ AFFILIATE Members, and we've just started)

Academic Programs

Undergraduate

Minor in Statistics and Data Science (Launched Fall 2016)

Graduate

Interdisciplinary PhD in Statistics (Launched Spring 2018)

Online

Micro-master (Launching Fall 2018)

Professional education (Launched Fall 2016)

IDSS

LIDS

MIT STATISTICS + DATA SCIENCE CENTER

Why Interdisciplinary

We need to train our students in Statistics / Computation / Data Science

Across MIT

No single UNIT at MIT can achieve this

Statistics does not belong to any UNIT / it is not a UNIT

Collectively we can: Engineering, Sciences, Sloan, HASS, Architecture/Planning

Each school has its strength that it brings to the table

"Local" Opportunity

We (as a committee) had a near consensus across MIT (not usual)

Structural Elements

Elements of the program

- Admission
- Course requirements
- Thesis
- Community

Management of the program

- Institute wide standing committee
- Graduate representative within UNIT

Structural Elements

Admission

Students are admitted through their home units

Students ALREADY admitted become eligible for the program

Every semester, students can *apply* for the program by certain date

Selection process is done in two steps

Step 1. Student's HOME unit decides first

Step 2. Institute-wide PhD committee decides next

Structural Elements

Course Requirements: across four foundations

Probability: *same* for all units

Statistics: *same* for all units

Computation and Statistics: *varies* (to small degree) across units

Data Analysis: *varies* (very diverse) across units

These requirements are *in addition*

with respect to their home unit's requirements

Structural Elements

Thesis

Must be relevant to Statistics and Data Science

Process

Students submit thesis proposal

HOME unit representative with advise from PhD committee decides

If *relevance* is not established, despite satisfying all requirements

student will *not* receive Interdisciplinary PhD

but, may receive PhD from the HOME unit

Structural Elements

Community

Mandatory Graduate Research Seminar as part of PhD requirement

Offered once a year

Guest lectures from across campus

Weekly activities run by SDSC

Seminar Series

Student Tea

Swanky space within IDSS with coffee!

Structural Elements

Management of the program

Interdisciplinary PhD committee

Membership from every participating UNIT

SDSC manages it

Course offering

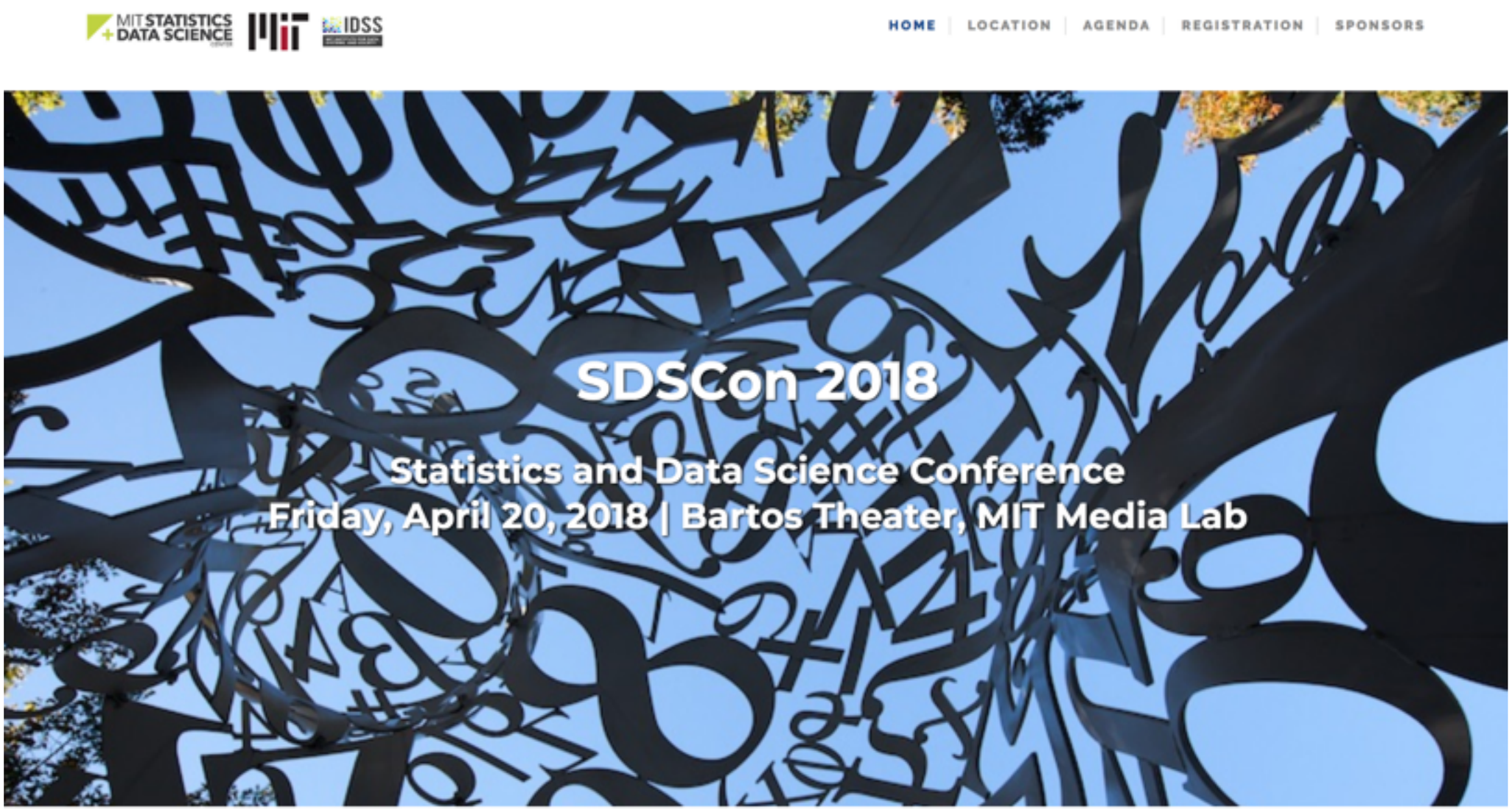
SDSC / IDSS provides resources: Faculty time, TA

SDSC continually monitors courses

Website, course catalog, etc:

SDSC / IDSS provides admin support

Annual Conference



SDSCon 2018 is the second annual celebration of MIT's statistics and data science community. Organized by MIT's Statistics and Data Center (SDSC), the conference will feature presentations from established academic leaders, industry innovators, and rising stars in the field. Discussions will cover a wide range of theory and application, representing the latest research and breakthroughs in statistics and data science.

https://sdsc2018.mit.edu/

Opportunities around MIT

We have developed unique strengths at SDSC

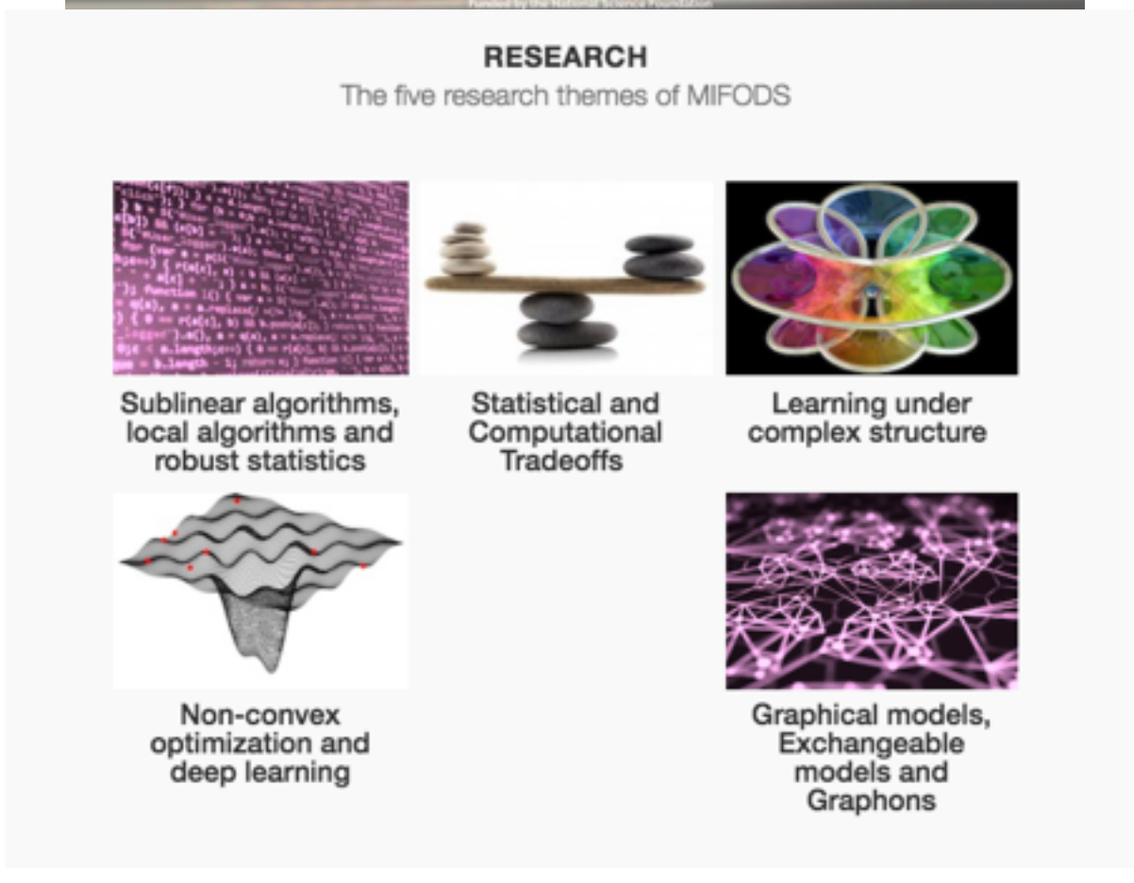
Connections with Social Sciences

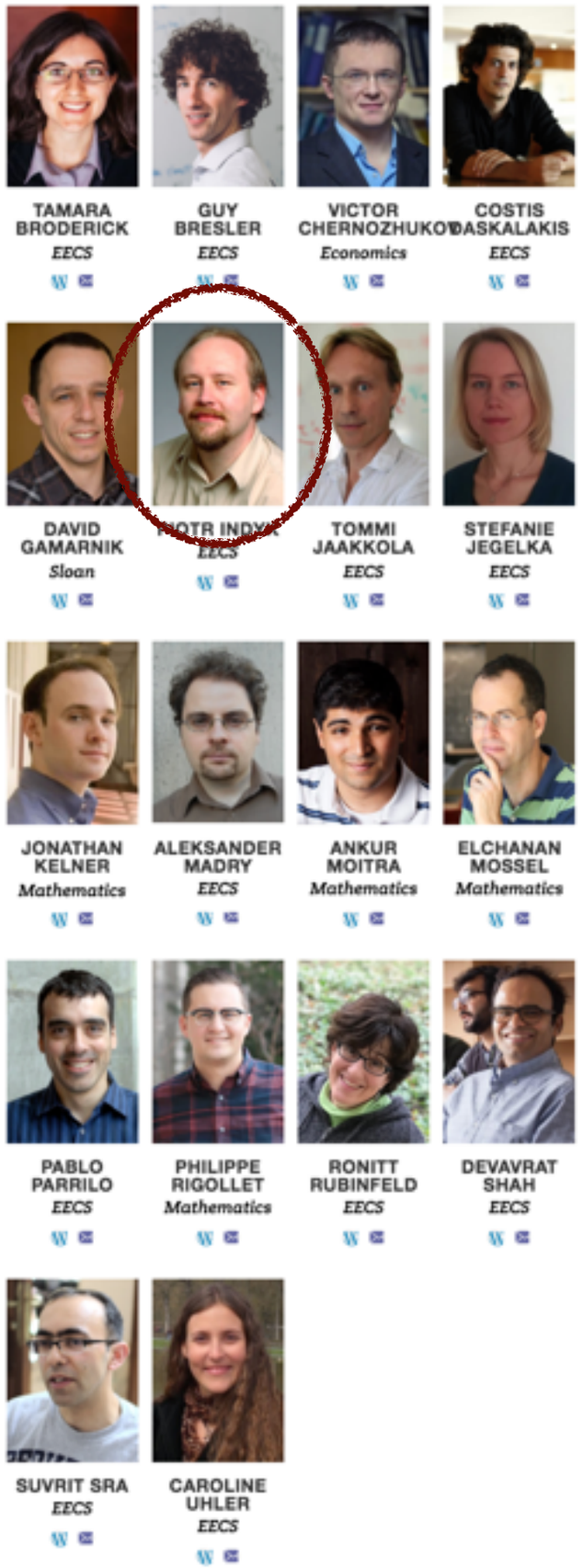
Connections with Life Sciences

Connections with Computation

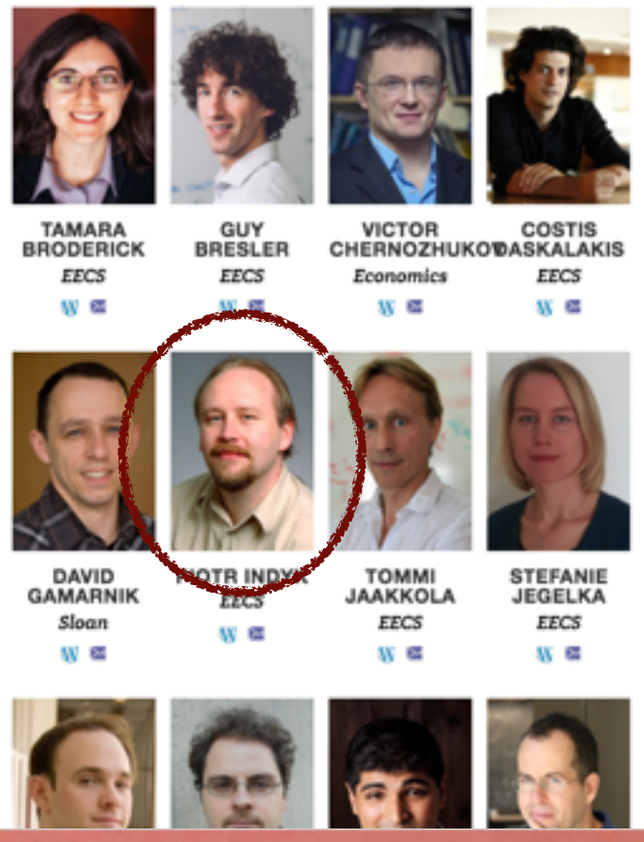
+ Leaders in theoretical and applied Statistics and Data Science

MIFODS (NSF TRIPODS) meets SDSC





MIFODS (NSF TRIPODS) meets SDSC



http://mifods.mit.edu/sublinear.php