RUTGERS
School of Arts and Sciences

COMPUTER SCIENCE

A New Vision:
Creativity, Innovation and Impact

Dimitris N. Metaxas
Distinguished Professor of CS
Department Chair

Current State of the Department

- **Faculty**
  - 41 Tenure track Faculty
  - 8 Teaching Faculty
  - Research and Visiting Professors

- **CS Areas:**
  - Computer and Networked Systems
  - Intelligent Systems and Data Science
  - Theory of Computing

- **Students:**
  - 9,100 students in computer science classes
  - 242 computer science majors graduated, 2016
  - 947 declared computer science majors, 2016

- **Alumni**
  - Many top performers in industry and academia as you will witness today!

Current State of the Department

- Collaborations with Several Departments and Centers:
  - Mathematics, Psychology, Arts, Medicine, Life Sciences, Business School, SCI

- New CS areas we are engaging: Intelligent Systems, Data Science, Smart Cities, Digital Humanities, Computational Arts, HCI,

- Our ranking has recently improved by 6 points

- Will continue to improve as the department grows in exciting new research areas, creates new educational programs and improves its engagement with industry and our alumni.

Seven Innovative New Faculty
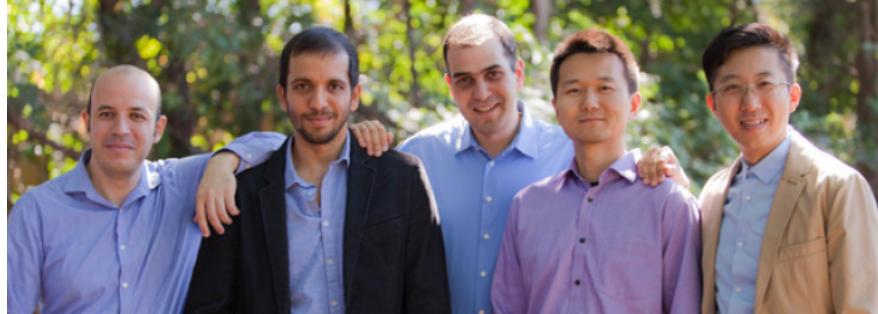
Pranjal Awasthi

Machine Learning, Theoretical Computer Science:
Conducted award-winning research in machine learning using local membership queries (not pictured)

Abdeslam Boularias

Robot Learning:
Developed state-of-the-art algorithms merging mathematical tools with practical engineering skills

Mubbasir Kapadia

Autonomous Virtual Humans, Crowd Modeling, Human-Aware Architectural Design, Computational Narrative:
Two co-authored volumes in Virtual Humans

Konstantinos Michmizos

Computational Neuroscience, Neuro-Rehabilitation Robotics:
Developed MIT-Anklebot which applies physical therapy to children with neurological disorders

Jingjin Yu

Algorithmic Robotics and Control, Cyber-Physical Systems:
Developed cutting-edge efficient algorithms for multi-robot path and formation planning

Desheng Zhang

Cyber-Physical Systems, Mobile Networking, Data Science:
Bridging Cyber-Physical Systems, Internet of Things, and
Data Science in White House Smart Cities Initiative

Gerard de Melo: (Jan 2017): Data Mining and Machine Learning for NLP

Computer Science Living-Learning Community for Women

- Rutgers has started a living-learning community that aims to support women computer scientists and increase their numbers in the field.

- The Center for Discrete Mathematics and Theoretical Computer Science (DIMACS), the Douglass Project for Rutgers Women in Math, Science and Engineering at Douglass Residential College, and the School of Arts and Sciences (SAS).

- "Increasing gender diversity in computer science is our goal," -Rebecca Wright, Professor, Computer Science

The CAVE

- The C.A.V.E. (Collaborative Academic Versatile Environment)

- More than just a hangout: The CAVE is stocked with Linux computers, movable whiteboards, and bungee tables perfect for collaborative work.

- "I was either in class, or I was at the CAVE," -Bill Lynch, Class of 2014 - Software Engineer, Google.

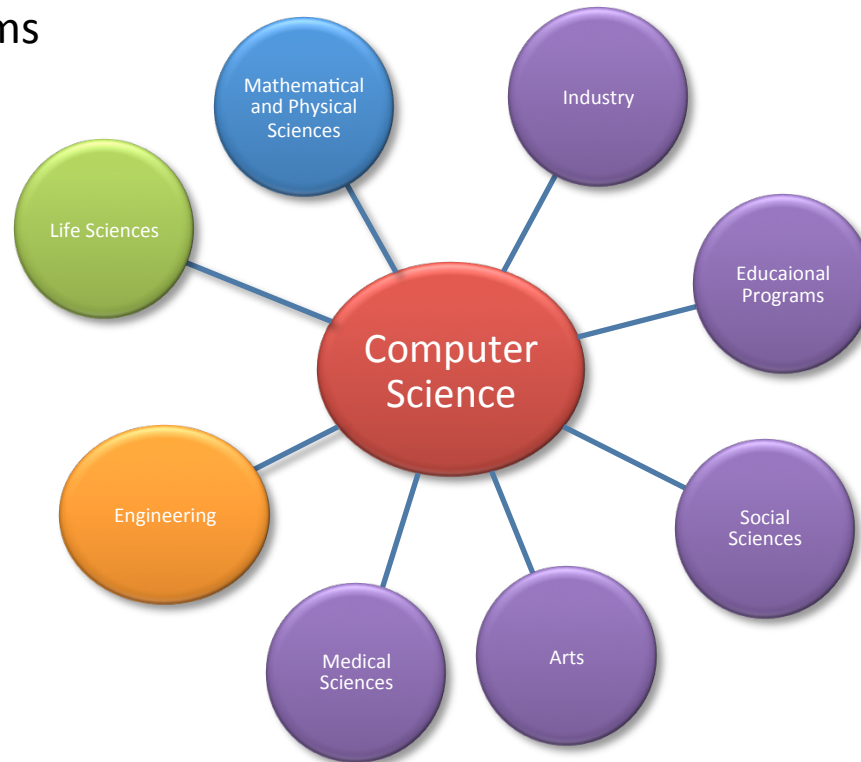# A Major that Provides Knowledge, Experience, and Community

- HackRU

- Women in Computer Science group

- Hack R Space

- Students go on to top graduate study programs across the country, as well as companies such as Google, Facebook, Amazon, and Verizon.

- "What I love about Rutgers is the sheer range of knowledge and experience that is available to you as an undergraduate. Whether it's through your courses or with student groups, or through independent research, you meet a lot of people, take in a lot of information, and get the chance to find your particular passion."

  - Poorva Sampat, Rutgers Computer Science Major
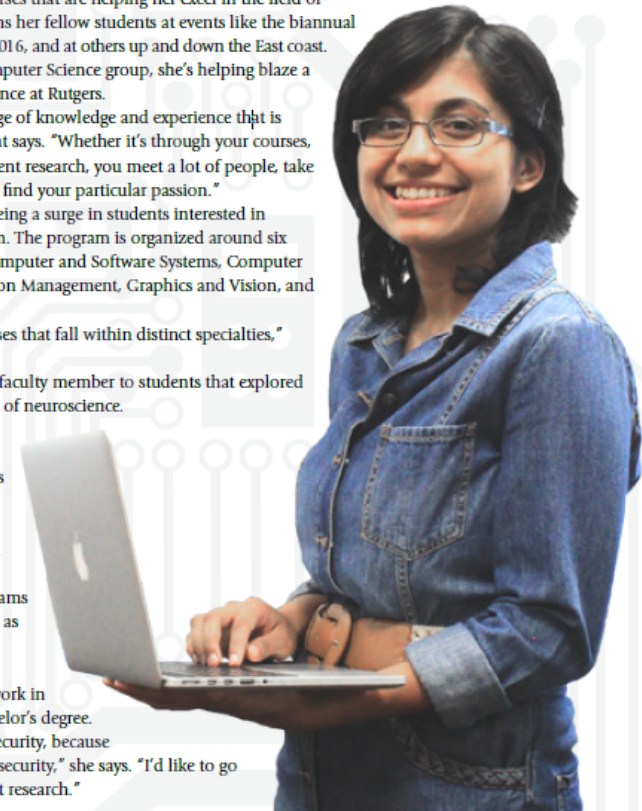
New CS Challenges

- Computer Science serves to connect and impacts all branches of science, arts and engineering
- CS is not just an enabler of research in other sciences.
- Most modern problems are complex and require collaborative research that will create new science in both CS and the other disciplines; **New and emerging type of research**
- Need for increased Industrial collaboration and Interactions
- Need for novel and Continuing CS/Multidisciplinary Education Programs

Mathematical and Physical Sciences

Industry

Life Sciences

Educaional Programs

Computer Science

Engineering

Social Sciences

Medical Sciences

Arts

Four Centers Chart New Technological Frontiers

- **CBIM** – Center for Computational Biomedicine, Imaging and Modeling

- **CDDA** – Center for Dynamic Data Analytics

- **RDI2** – Rutgers Discovery Informatics Institute

- **DIMACS** – Center for Discrete Mathematics and Theoretical Computer Science

Computer Scientists Develop Classroom Technology with Long Reach

- The VideoWall, developed at Rutgers by Doug Motto and Rich Martin

- Innovative video conferencing system developed by the Department of Computer Science is connecting classes across the across the expanse of the Rutgers community and allowing researchers to communicate across continents.

- "The goal is really to make distance irrelevant" –Rich Martin

Gone are the days of the isolated CS Department!

- **Computer Science** is what connects us all – our smart devices, our social networking, our information consumption, our problem solving, our safety, our education, our science, our daily work, and our economy:
  - **All aspects of life!**

- We want to address these challenges through new initiatives that will result:
  - **Innovation, Creativity and Impact.**

Where we want to take our CS Department?

Create a modern Department that is a leader in Research, Education and Industrial Impact:

- We see CS as a complex ecosystem that impacts the University and Industry

- Create the leaders of tomorrow in industry and academia:
  - **Our Students is our Mission!**

- Create new relationships with industry to improve education and conduct new research

- Enable incubation of new companies in NJ and worldwide in computing.

- Involve all of you and our Alumni in the new initiatives!

- We need all of you!

How to Achieve our Goals

- Hiring of 15 new faculty in such vital areas as intelligent systems and data science; artificial intelligence and human-computer interaction; large scale modeling and visualization; computer and networked systems; and security.

- New courses and tracks for undergraduates, investing in new Master's programs and enhancing our partnerships with industry.

- A key focus will be collaborative programs with other departments in the School of Arts and Sciences and across Rutgers, such that we will constantly evolve and gear our education and research environment towards **innovation**, **creativity**, and **impact**.
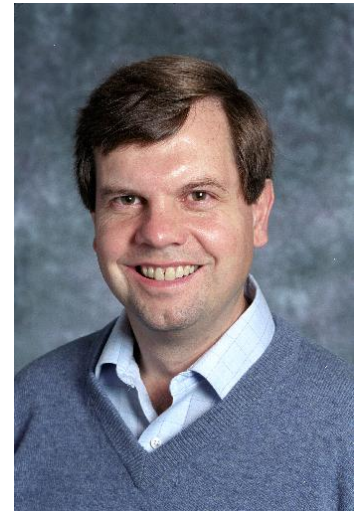
Special Thanks

Kaz Kulikowski

Tomasz Imielinski

Eric Allender

Special Thanks

And all our faculty who through their hard work have contributed to making our Department seek excellence in research and education.

Special Thanks

Jon Risinger
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Komal Agarwal
Joanne Walsh
Sarah Crawford
Carol Difrancesco
Ginger Olszewski
Regina Ribaudo-Dougherty
Doris Allen
Aneta Unrat
Maryann Holtsclaw
James Mielke
Lars Sorensen
Charles McGrew
Dana Rici
Kara Donaldson

Special Thanks

- **Our Deans**
  - Executive Dean of SAS Peter March
  - Dean of Mathematical and Physical Sciences Ron Ransome