MIT Schwarzman College of Computing Mission

Addressing the opportunities and challenges of the computing age — from hardware to software to algorithms to artificial intelligence — by transforming the capabilities of academia in three key areas:

- **Supporting rapid growth and evolution of computing fields, notably CS & AI**
  - Coordination
  - Collaboration
  - Adaptability

- **Facilitating computing collaborations across departments and disciplines**
  - Research and education, with all five schools at MIT

- **Focusing on social and ethical responsibilities of computing**
  - Incorporating humanist, social science, policy, and technical perspectives
SCC Combines New and Existing Activities

New cross-cutting areas
- Social and Ethical Responsibilities of Computing (SERC)
- Common Ground, for computing education
- Center for Advanced Studies of Computing (CASC)

Current units (now “at the same table”)
- Department of Electrical Engineering and Computer Science (EECS), joint with School of Engineering
- Operations Research Center (ORC), joint with Sloan School of Management
- Institute for Data, Systems and Society (IDSS) including Statistics and Data Science Center (SDSC), Technology and Policy Program (TPP), Sociotechnical Systems Research Center (SSRC)
- Center for Computational Science and Engineering (CCSE)
- Computer Science and Artificial Intelligence Laboratory (CSAIL)
- Laboratory for Information and Decision Systems (LIDS)
- Quest for Intelligence, including MIT-IBM Watson AI Lab

All students and faculty in these units are members of the College, often joint
Common Ground for Computing Education

Multi-department teaching groups to facilitate offering of computing classes and coordination of computing-related curricula across academic units at MIT

Objectives

- Develop **blended and integrated** computing classes at the knowledge frontier within the context of specific domains

- **Coordinate and streamline** offering of computing classes in multiple disciplines across MIT, such as numerical and simulation methods and machine learning

- Enable **co-teaching** of high-enrollment CS and AI classes, to foster collaborations and distribute computing teaching load across MIT

- Design an **embedded curriculum**, through course modules and materials, to infuse:
  - Social and ethical issues in computing classes (with SERC)
  - Computation in existing classes
## Common Ground Initial Scope

<table>
<thead>
<tr>
<th>Foundational CS + AI</th>
<th>Fundamentals of Computational Science + Engineering</th>
<th>Social and Ethical Implications of Computing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming, algorithms, data structures and rapidly expanding topics such as machine learning and data science</td>
<td>Modeling of physical systems, discretization and solution methods, control, design and decision making</td>
<td>Pedagogical materials – case studies, homework problems, active learning projects – from computer scientists and engineers working together with humanists and social scientists</td>
</tr>
</tbody>
</table>

### Core + Customization

- Developed and co-taught by experts from different departments and customized through problem sets, recitation, add-ons, follow-up courses
- **Pilots**
  - 6.0001/6.0002 with DUSP
  - Machine Learning for Engineering and Science with ChemE

### Embedded Curriculum

- Infusing materials into existing classes
- **Pilots**
  - SERC in CS and AI classes, 6.170, data viz
  - Discussion of computing in existing classes in School of Science

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Two models currently being explored
Social and Ethical Responsibilities of Computing

Vision
A world in which social, ethical and policy considerations are actively woven into the teaching, research and implementation of computing.

Mission
Train students and facilitate research to assess challenges and opportunities associated with computing, so as to improve design, policy, implementation and impacts.

- Incorporating multiple perspectives, across disciplines and beyond academic.
- Developing technologies for human benefit and well-being.

SERC

1. Coordinated curriculum
2. Case study series
3. Active learning projects

SERC Research

1. Research consultancy
2. Dissertation clinic
3. Research catalyst

SERC Engagement

1. Policy lab
2. Public forums
3. Civic groups

(New) Postdocs program

(New) SERC Advisory Board, consisting of faculty, students and staff from across MIT.
Social and Ethical Responsibilities of Computing

Pilots

- **Teaching**: case study series — commission and curate brief cases (5K–6K words) appropriate for embedding in undergraduate classes as well as of interest for additional audiences

- **Research**: dissertation clinic — for Ph.D. students working on computing-related projects to engage in research on ethical, social, and/or policy implications of their work as part of their thesis

Engagement

- **Advisory board**: ~ 20 faculty from 10 DLCs

- **Case study board**: ~ 50 faculty from 20 DLCs based on input from 14 department heads across schools

- **Two action groups**: on HW problems and on policy, ~20 faculty from 10 DLCs
Center for Advanced Studies of Computing

Seeding collaborative educational, research, policy and practice projects, and starting new initiatives, curricula, research collaborations, multi-investigator grant applications and more

- Project-oriented, with MIT faculty leader, possible external co-leader, and mix of students, researchers, practitioners and faculty
- Six-to-twelve month duration
- In each of three key areas: computing fields, computing across disciplines, responsibilities of computing
- Pilot projects for 2020–21 academic year; call for proposals forthcoming
  (Small-scale projects until fundraising permits scaling)
### Beyond SERC, Common Ground and Existing Units

#### Other cross-cutting activities

<table>
<thead>
<tr>
<th>Quest for Intelligence</th>
<th>AllA — Artificial Intelligence Innovation Accelerator, with Air Force</th>
<th>Faculty hiring, 25 new shared College positions with departments/schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadening the Center for Computational Science and Engineering and expanding educational initiatives</td>
<td>Potential other computing collaborations and initiatives</td>
<td>Convenings and thought leadership events</td>
</tr>
</tbody>
</table>
Cross-Cutting Research Examples

Funding based on internal MIT calls for proposals

**Quest for Intelligence**

- ~120 PIs on Quest funded projects (has been up to 140), e.g., IBM, Liberty Mutual
  - 22 departments and all 5 schools, 25% women
- 50% SoE, 27% SoS, 9% Sloan, 7% SHASS, 7% SA+P (which approximately mirrors research funding per school)
- 250 UROPs, 47.2% women
- ~50 projects received cloud credits across campus
- 8 projects across campus with Quest research scientists in partnership

**AllA — Artificial Intelligence AI Accelerator**

- 10 projects, 30 faculty PIs, 1/3 outside College of Computing (from SoE, SoS, SHASS), 1/3 women
Main Changes for Students

Curriculum changes driven by departments and by Common Ground multi-department collaboration (over time)

- Revisions to Course 6 curricula with EECS Faculties of EE, CS, AI+D
  - Possible new AI-related major or minor
- Possible additional new minors and majors, including blended programs
- Embedding social and ethical responsibilities in classes and facilitating multiple perspectives in research
- Clearer coordination among programs with computing focus
  - e.g., numerical and simulation methods, CCSE
- Additional opportunities to combine computing with other disciplines, in classes/majors/minors and in research projects
Faculty Hiring

Current searches

- 5 core computing positions in CS and AI+D
- 1 shared position with Philosophy
- 5 other joint searches involving College units with positions from other units (1 BCS, 1 Broad, 1 IMES, 2 IDSS/SoE)

Total of 25 new core positions

- 3 CS and AI+D hires last year, plus above 5 this year

Total of 25 new shared positions

- Searches starting next year after identifying multi-school cluster hiring areas, plus above 1 this year (areas to be determined by the 6 academic deans and provost)
- Specific departments will be authorized to search jointly with one or more units of the College as part of each multi-school cluster hire
- Proposals for cluster hiring areas are due March 20, from department heads
Creating the College of Computing

Consultations
Spring 2018
- Department Heads
- Academic Council
- EECS Leadership
- EECS Faculty
- IDSS Leadership
- Course 6-9 Leadership
- Course 11 with 6 Leadership
- Math Council
- SHASS Council
- Course 6-14 Leadership
- Course 6-7 Leadership
- CSAIL Leadership
- Sloan Council
- SoS Council
- MechE Faculty
- SA+P Council

Planning
Summer 2018
- EECS Faculty
- SoS Council
- SHASS Council
- Department Faculty Meetings
- Student Leadership

Engagement
Fall 2018
- Staff Forum
- Student Forum
- Alumni Forum
- EECS Forum
- Presidential Advisory Cabinet

Computing Task Force
Winter 2018-19
- Organizational Structure Working Group
- Faculty Appointments Working Group
- Curricula and Academic Degrees Working Group
- Social Implications and Responsibilities of Computing Working Group
- Computing Infrastructure Working Group
- Task Force Community

Turing Award Winners’ Tech Letter
Sept. 20, 2017

Department Heads
Academic Council
EECS Leadership
EECS Faculty
IDSS Leadership
Course 6-9 Leadership
Course 11 with 6 Leadership
Math Council
SHASS Council
Course 6-14 Leadership
Course 6-7 Leadership
CSAIL Leadership
Sloan Council
SoS Council
MechE Faculty
SA+P Council

College of Computing Announcement
Oct. 15, 2018

Staff Forum
Student Forum
Alumni Forum
EECS Forum
Presidential Advisory Cabinet

Inaugural Dean Named
Feb. 15, 2019

Organizational Structure Working Group
Faculty Appointments Working Group
Curricula and Academic Degrees Working Group
Social Implications and Responsibilities of Computing Working Group
Computing Infrastructure Working Group
Task Force Community
Creating the College of Computing

PLANNING
Spring/Summer 2019
- Task Force Reports
- Task Force Steering Committee
- Institute Faculty Officers
- EECS, IDSS, CSAIL, LIDS Staff
- GSC DEI Committee
- UA Officers
- IDSS, CSAIL, IMES Leadership
- School Deans

EECS PLANNING
Spring/Summer 2019
- EECS Leadership
- Engineering Council
- EECS Faculty
- EE Faculty
- CSAIL PIs
- EECS Grad Student Assoc
- EECS Junior Faculty

PLANNING
“STRAWMAN” DOCUMENT
Fall 2019
- CCE Faculty
- School Deans
- Engineering Council
- ORC Leadership
- UA Officers
- SAP Council
- SHASS Council
- Faculty Policy Committee
- ChemE Faculty
- Science Council
- Open Feedback Sessions (4)
- Statistics Faculty
- Quest & J-Clinic Leadership
- MechE Faculty
- Academic Council
- Machine Intelligence Students
- NEET Leadership

PLANNING
Fall/Winter 2019-20
- MIT Faculty Meeting
- ORC Faculty Meeting
- IDSS Faculty Meeting
- Sloan Group Leaders
- SCC Student Advisory Group
- Aero Astro Faculty Meeting
- OVC Leadership
- RLE, MTL Directors
- PAC Student Group
- SERC (School Councils)
- Common Ground (Depts)

UPCOMING:
- School Councils (All 5)
- Corporation
- AO/FO
- Info Group
- MIT Faculty Meeting
Fundraising

- **$1B goal**: over $700M donor commitments to date
- Donor commitments are paid to MIT over multiple years
- **Two main uses of funds**: additional endowment and new building, given growth in faculty and grad students
- **Endowment**: once funds are received, pays ~ 3% of principal for program support
- Some of the new endowment will go to pay for things other than operation of the College, such as student financial aid
Building Planning and Schedule

Schwarzman College of Computing administrative headquarters + more

Building 45 Program Elements (design goal)
- 50 faculty research groups (core and shared; existing and new hires)
- Mix of lab space type enabled by infrastructure (dry, damp/dirty and potentially wet lab)
- Two Registrar-reservable classroom (60 and 300+ persons)
- Long-term residents to the building (CASC visitors to MIT and MIT annual project teams)
- MIT community convening space, including open and closed meeting spaces
- Café, street level
- Potential event space, top level
- SCC Dean’s Office, and admin home of Quest for Intelligence

Building 45 Timeline

05.19 09.19 03.20 06.21 06.23 08.23

Pre-programming
Concept design
Schematic design
Construction
Occupancy
Thank you