APPENDIX:

COMMENTS ON MIT SCHWARZMAN COLLEGE OF COMPUTING WORKING GROUP REPORTS

1. Comments Received via Working Groups Email Address
2. Memo from the Department of Economics
3. Ideas from the Working Groups Idea Bank
1. COMMENTS SENT TO COLLEGE OF COMPUTING WORKING GROUPS EMAIL ADDRESS

College of Computing report feedback/suggestions

“I have some feedback on the report, particularly the academic degrees section. I think having a Professional Degree in Computation would be really beneficial, although I think many people would be interested in a professional master’s degree for CS undergrads as well. I know many people (myself included) who would be interested in this, as it is something that isn’t offered at MIT currently.

The report also mentions how the professional degree would improve workplace connections, which I think would be very valuable as well. Harvard has a nonprofit student group for consulting, where they use data analytics to help various companies. I think this is something that many students would be interested in as well. Overall, I think having a Professional Master’s Degree offered from the College of Computing would be highly beneficial and many people would be interested.”

Data Visualization

“I was just thinking that data visualization should have a high importance in the College of Computing as it is the glue between engineering and humanities. I believe there is an ethic not just in terms of data management, but also in terms of visual representation. Digital identities and quantified-self approaches are present in all the large systems as Google and Amazon. The computational ethic is about individuals and not social class.

If I should say which mix should run the future College of Computing, I would say that it is the moment for universities to make people aware, sensitive, participative to their computational side. It is the opportunity to make engineering and its opportunities available and open to everyone.

Thank you for considering my thought.”

MIT Schwarzman College: Preliminary Reports

“I read the report of the working group on ethics and social implications.

Nowhere in the report is any hint that some of the major funders of research in CS, and even in the social implications of CS, depend for their profits on working against the interests of society. This is especially true in the case of privacy; all of the “free” Internet services, especially Google and Facebook, would not have the commanding position they do if they didn’t build confidential profiles of users (and even of non-users, in the case of Facebook) for the sale of targeted advertising.

The report even holds up as praiseworthy Google’s funding of social policy expertise, even though Google’s goal in understanding social policy is the preemption of strong privacy laws (e.g., in California) by weak privacy laws.
What this all implies is that an honest effort at understanding and influencing social implications of computing will involve biting the hands that feed you. The report would be much more useful if it moved past abstractions to confront this conflict of priorities.

Another issue I have with the report is that it privileges a Rawlsian view of ethics, defining the field in terms of fairness and justice. You should leave room in your definition for an Aristotelian/communitarian/virtue view of ethics, e.g., Alasdair MacIntyre’s After Virtue.”

Diversity and inclusion at Schwarzman

“I was reading the preliminary working group reports and couldn’t figure out if there is a team looking at inclusion and diversity for the college. Could you let me know who is working on this topic?”

College of Computing and Global Strategy

“The process of creating the College and the messaging around it have appeared very inward-looking, which is counter to current messaging around the fundraising campaign and the recent global strategy report. What will be the global strategy for the College, especially in terms of student learning, faculty research and partnerships? It would be useful to bring this discussion into the process now. Just as students need to be “bilingual” in computing, in order to become future leaders they need to be able to understand, work with and learn from people of other cultural backgrounds. However, given the pull of Silicon Valley, it has become more difficult to attract Course 6 students to opportunities such as MISTI internships. How can we leverage the creation of the College to develop compelling new global learning opportunities connected to computer science? Each year some 250 MIT faculty apply for MISTI Global Seed Funds to collaborate with colleagues around the world. Perhaps there is a way to target seed funds in a way that would help achieve some of the strategic aims of the College (ie, funds for projects led by faculty from the College and at least one other School, or funds for projects on specific research topics).”

What is the Composition of the College’s Visiting Committee?

“Given the arduous process of Committee nominations and appointments currently, have you started this process for the College? If not, when is it scheduled to start and the Committee to be in place?”

Cornerstones for the College of Computing

“A huge thing I noticed about the draft reports from the College of Computing working groups is they are all coming at this with a piece of the puzzle. It’s like everyone has a piece of the shattered glass sphere that is The Truth but don’t realize it. The big question seems to be how to get them to realize they have a piece
so they can reassemble the sphere back together under a single unifying vision instead of potentially trying to cut each other with their shard?

It seems that if we apply MIT’s motto mens et manus we have mind and hand. To me this represents the thinkers and the makers. The makers create the new computing technologies and conduct the research and the thinkers consider the implications, history, and impact of computing technology on our lives and explain to us that though we can make a velociraptor why it’s probably a really bad idea. In my opinion, in the makers and the thinkers we have the first 2 cornerstones upon which it seems the new College of Computing should be built upon.

But looking at our world, especially our computing microclimate here at MIT, computing is no longer a niche technology or a luxury. It has become a ubiquitous necessity to get anything done. Not everyone is an engineer, or historian, or biologist, but everyone needs to be able to use a critical piece of computing technology called the computer. It has become as crucial as consumption of electricity, food and water in the role it plays in our lives. So I believe that a third cornerstone, the user, has to be considered. We are in this all together. Technology affects all of us. In my 10+ years at MIT, education of the user of the technology itself, never mind the risks, limitations, and best practices, has been a challenge. We expect our students to come to MIT with a basic and in some cases, prerequisite understanding of what computing technology is and how to use it. However, our expectations from our staff and faculty are considerably less straightforward but in every way just as crucial.

While MIT excels on the cornerstones of The Maker and The Thinker, it is very weak on education for The User. IS&T went from a more user-centered organization when I first joined in 2008 to something closer to a service provider today. In SHASS over the past decade, we have endeavored to turn this around specifically with education directed at the user (shassis.mit.edu). For us, educating the user isn’t just about knowledge and habits but also self-sustainability and empowerment which leads to greater independence and freedom from fear and the persisting existential threats that exist. And we often continue to forget that these threats exist to the user by and from other users.

It seems to me if you want to create a College of Computing that exists on the cutting edge of the innovation wave, you have to ride that wave with The User which also includes its antithesis of hacking and development of technologies designed to circumvent or undermine our confidence in the computing technologies we all rely on. Emphasis on the user was something that I learned from Steve Jobs back from my days at Apple and it’s training I use every day in my job here at MIT. The entire success of the business rested on the cornerstone of The User and selling the superior user experience.

Here is an example of one of the many user oriented resources we provide directly to our users.
Anyway, this is just a thought. Thank you for reading.”
2. MEMO FROM THE DEPARTMENT OF ECONOMICS

“My colleagues in the Economics Department and I want first to express our deep appreciation for the extraordinary job done by each of the working groups. The collection of reports is thoughtful and informative on the challenges facing the new College. The attached letter provides feedback on some of the specific proposals in the reports, on behalf of the Department. Thank you for your consideration.”

-Nancy L. Rose
Department Head, Economics
Charles P. Kindleberger Professor of Applied Economics
June 19, 2019

MIT Stephen A. Schwarzman College of Computing
Task Force Working Groups
comptaskforce@mit.edu

Re: Comments on Working Group reports

Dear SCoC Task Force members,

I’m writing on behalf of myself and my colleagues in the Economics Department to offer input on the draft reports of the SCoC Working Groups. Let me begin by thanking the Working Groups—again on my own behalf and that of my entire department—on the thoughtful, constructive, and creative reports that you have produced. It is no small feat to envision a fresh academic structure that crosses disciplinary boundaries and unites interests, pedagogy, and resources across the Institute. This complex enterprise inevitably poses challenges and necessitates tradeoffs among competing objectives, and I laud your excellent work. The purpose of my letter is to highlight concerns of special moment to Course 14 and to propose possible modifications to address them. Some of these concerns may be shared by other units in the Institute, while others may be specific to Economics or to SHASS. Regardless, I thank you in advance for considering them.

1. Partial appointments

My colleagues and I are supportive of the proposed structure of appointing Multi-Community Faculty (MCF) who cross the boundary between the SCoC and a home department. The MCF model seems a savvy approach to assuring that these (previously-called) bridge faculty have both a strong disciplinary base and a deep intellectual stake in the SCoC. We have several concerns about the implementation, however.

The proposed 50/50 appointment structure seems effectively a 100% appointment tax for SHASS units, and perhaps for other smaller MIT units elsewhere. We do not have half-slot appointment options with other departments available to us. For smaller MIT units—including all departments in SHASS—this is likely to create integer problems. Take the case of a department such as Anthropology (Course 21A) that has twelve faculty lines. Devoting a half line to a MCF in the SCoC would leave the department with a second half of line unused, thus effectively reducing faculty headcount (given the 50/50 teaching split) and potentially prompting the unit to seek a second SCoC appointment to take up the slack—neither of which is desirable. We would like to see a structure that preserves the incentive properties of the proposed MCF structure without effectively hobbling smaller departments. Here are three possibilities:

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1 I infer the number of faculty lines from the current number of faculty members. This is approximate of course.
a. Allocate MCF appointments in full units—so if course 21A receives an MCF appointment, this increments rather than decrements its effective headcount. This proposal would solve the integer problem. It would not necessarily provide ‘skin in the game’ for the home department, however. Also, if the goal is to effectively double the number of MCF appointments by using only one half an SCoC slot for each MCF appointment (we weren’t sure if this was a bug or a feature of the Working Group’s SCF proposal), this design would not achieve that goal.

b. Require the disciplinary department to contribute half of the salary of the MCF appointee but not contribute half a slot. This provides appropriate incentives, solves the integer slot problem, and doesn’t imply any double-counting of SCoC slots. It may, however, make participation in MCF appointments infeasible for departments, particularly smaller ones, that do not have funding for faculty lines beyond their authorized number of slots.

c. Establish high standards while allowing for flexibility. One can confidently predict that the launch of the SCoC will set off an Institute-wide scramble for slots, and this will make it politically challenging for SCoC leadership to allocate slots in a way that maximizes the Institute’s educational and research excellence. While the MCF appointment structure outlined in the Working Group reports is a strong start (with the caveats above), recognizing the diversity of faculty sizes, resources, and immediacy of intellectual connection to the SCoC across the Institute’s departments, it is unlikely that any one set of arrangements will serve all potential MCF appointments well. We recommend that SCoC build in some flexibility in the MCF structure so that each MCF arrangement complements the research strengths, academic needs, and resource constraints of the participating MIT units.

2. Revocable appointments

We are quite concerned by the Working Group’s proposal that MCF appointments may be revoked ‘at will’ by SCoC (i.e., “If currently offered topics become less popular or otherwise are no longer considered Common Ground, the Computing Council could effectively move that member of the faculty back to his or her home department by pulling the portion of the slot it is funding”). This structure has multiple drawbacks.

Indeed, isn’t the problem even more severe than that? An MCF who is “moved” back fully to her home department would consume both a full slot and full salary costs for the home department. This is a large risk for small academic units.

The notion of revoking joint appointments is counter to the structure of academic organization at MIT and elsewhere. In the Institute’s closely scripted hiring and tenure process, departments have the opportunity to revoke appointments at only three points in a scholar’s career: at first renewal, at promotion to untenured associate, and at tenure. Tenured appointments cannot be revoked, which gives departments exceptionally strong incentives to make these high stakes appointments carefully. In this context, reserving a one-sided ‘revoke at will’ option for SCoC but not for the home department seems extraordinarily risky for all non-SCoC departments involved. This structure effectively
provides SCoC with an insurance policy against dissatisfaction with any MCF hire—and makes the home department the insurer. If this structure were enacted and SCoC exercised this revocation option, we suspect this would have undesirable long-term consequences for the relationship between SCoC and the other academic unit—so much so that it’s plausible that SCoC would never exercise this ‘nuclear option,’ thereby blunting its incentive effects.

Moreover, this proposal relegates MCF faculty to second-class status at the Institute. To our knowledge, no other tenured faculty are required to go through regular reviews of their research and teaching contributions just to maintain their tenure line appointment. Imposing this requirement could make it difficult to recruit top faculty, particularly the leading-edge stars we are hoping to bring on board to the SCoC.

We propose instead that the Institute allocate the same refusal rights to SCoC as given to the home academic unit. For junior faculty, SCoC could elect to revoke MCF affiliation at either promotion to associate or at tenure, regardless of the decision of the home department. For tenured MCF faculty, this revocation option would not be available. This alternative structure provides both SCoC and the home department with powerful incentives to choose MCF appointees carefully. But it does not shift risk inordinately onto the home department.

Note further than this structure does not imply that the tenure lines of MCF faculty run through two departments. If for example, SCoC choose to revoke an MCF’s affiliation at promotion, the home department could nevertheless choose to promote. Similarly, if the home department chose not to promote or tenure the MCF faculty member, the SCoC could nevertheless appoint the MCF faculty member to an exclusive SCoC slot if desired (presumably, this would happen rarely).

3. The Role of Humanities, Arts, and Social Sciences in SCoC

From the overall excellent report on the Social Implications and Responsibilities of Computing, one could potentially draw the (mis-)impression that the primary or exclusive potential contribution of the humanities, arts, and social sciences to the mission of the SCoC is to study societal, ethical, and policy implications of computing. While we agree that these are central contributions—already prominently embodied in the Institute-wide Work of the Future Task Force launched by President Reif in the spring of 2018, and shaped by the research agendas of leading Economics Department and Sloan faculty members—it is also the case that the advent of computing has catalyzed new fields of inquiry within arts, humanities, and social sciences, and that these fields could also be situated within SCoC through MCF faculty appointments.

For example, in Economics, research in data science has emerged as a critical tool for statistical prediction, causal inference, and model selection with vast, high-dimensional data sets; scholars in Economics, Law, and Computer Science are collaboratively defining and field-testing notions of algorithmic fairness in candidate selection, pretrial release determination and bail-setting in the judicial system, and college admissions; Economists and Computer Scientists are jointly applying algorithmic game theory to assess models of human behavior and cooperation; Economics and Electrical Engineers are pairing network

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2 We suggest that SCoC not have refusal rights at first renewal. This is too early in the scholar’s career for the non-home department to be making high stakes decisions about the appointee.
theory with economic theory to model and manage congestion on computer networks; and Economists are applying market design tools from Operations Research to structure the design of e-commerce systems, public school choice mechanisms, and even the allocation of cadaveric kidneys.

While my colleagues and I are not as familiar with the state of the art in other SHASS departments, we strongly suspect that these fields have also developed frontier applications of computing within their disciplines. In structuring the cross-cutting mission of SCoC, we therefore urge the Working Groups to recognize that SHASS disciplines are not relevant to SCoC only because they illuminate implications of computing but also because the computing subdisciplines that these fields have developed are in many cases themselves a worthy contribution to SCoC’s core mission.

4. Recognizing the Diversity of Teaching Contributions to SCoC

My colleagues and I support a robust educational mission for SCoC. We agree that MCF’s should play a key role in this mission. We had three specific concerns on the structure outlined by the Working Groups

a. **Boot camp requirement**

   We are concerned about the impact of introducing a required pre-semester summer computational prep boot camp for students with weaker computing backgrounds. As noted in the report, this may fall disproportionately on students of low SES and interfere with summer work plans. In addition, entering MIT students will just have completed high school and arguably deserve a summer to catch their intellectual breath before matriculating.

b. **Computation GIR**

   We wholeheartedly support the education of MIT students in the basics of computational thinking. However, we strongly believe that adding a Computation requirement to the MIT core curriculum would not work well for our students. The current state of the GIR system is already highly burdensome and severely limits MIT undergraduates’ ability to explore fields outside of the traditional MIT core during their freshman and sophomore years.

   Although history has shown that MIT’s GIRs requirements are extraordinarily difficult to update or relax, the SCoC’s important mission may both necessitate such a change and provide a unique opportunity for it. We would enthusiastically support modernizing the GIR system to enable students to choose among a set of carefully selected GIRs—where choice means both a menu of GIR options to select from and the flexibility to decide when to exercise the pass/no-record option for these GIRs (as per the current GIR experiment). Within this more flexible—and not more burdensome—system, we would enthusiastically welcome a Computation GIR.

c. **Common ground curriculum as a gatekeeper for MCF appointments**

   We concur with the view that MCF faculty should contribute to the educational mission of SCoC. We believe, however, that MCF contributions to the proposed Common Ground Curriculum should not be the sole gatekeeping mechanism for crediting MCF faculty teaching. Say, for example, that MCF faculty members teach classes on the economics of networks, the design of online marketplaces, computational game theory,
or causal inference for data scientists. Some of these subjects might fall outside the SCoC Common Ground Curriculum but would nevertheless make frontier educational contributions to the mission of SCoC. It would be unduly restrictive (and inequitable) that MCF’s teaching contributions in these fields not be permitted to count as SCoC service.\(^3\)

We suggest instead that SCoC establish a formal vetting process by which MCF appointees (and their home departments) can propose subjects for SCoC credit. Subjects outside of the Common Ground should be judged eligible if their content complements and advances the educational mission of SCoC. Formal procedures and guidelines would need to be developed, of course.

Thank you once again to the Working Groups for leading this complex endeavor and for closely considering the points raised above. My colleagues and I would appreciate the opportunity to discuss these topics in person with the SCoC Working Groups as planning for the Schwarzman College moves rapidly forward.

Sincerely,

\[\text{Nancy L. Rose} \]
\[\text{Department Head} \]
\[\text{Charles P. Kindleberger Professor of Applied Economics} \]

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\(^3\) Consider that any class offered by a fully appointed SCoC faculty member, e.g., including all current EECS faculty as currently envisioned by the SCoC Working Groups, would count as a SCoC contribution.
3. COMMUNITY INPUT FROM THE IDEA BANK

The Idea Bank was introduced so that the community could provide feedback as a part of the Working Groups process. For MIT affiliates, the Idea Bank is available online at https://comptf.mit.edu/idea-bank. There, posts include author names, when included. Posts on the Idea Bank can be sorted by the working group(s) to whom each author addressed their comment; in this document, this information is included as a list of tags.

**Intelligent and Ethical Computing as an enabler of Wellness, especially for an aging population**

Tagged:
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

“eCollaborative Ventures, Inc. (eCV), is a collaboratory of international experts created to address today’s Grand Challenges. The eCV Collaboratory performs International Collaborative Research and Development (R&D) on Grand Challengers that benefit individuals, society and the environment around the world. eCV incorporates a holistic methodology that balances technical solutions in a secure and trusted way while including ethical, social and cultural considerations. In particular eCV is concerned that, in the rapid advances in technology in IoT and AI, companies, in a rush to get to market, are not adequately considering the unintended consequences of developing ‘smart’ devices or AI algorithms. Therefore eCV is researching concepts that will add ethics and morals, but more important wisdom in the form of “Sophia” to these systems. Sophia is a central idea in Hellenistic philosophy and religion, Platonism, Gnosticism, Christian and Jewish theology. If we make the analogy that wisdom is the human brain, then Sophia is the human brain, heart and soul. To implement this vision: we have been developing a conceptual framework to insure that AI and other advanced computing in general, results in solving problems, rather that creating new ones, or exacerbating old ones. Building on the legacy of Vital Electronics, we are introducing ePioneering as a new approach to leveraging Information and Communication Technology (ICT) and Internet of Things (IoT) to benefit people. ePioneering is a combination of new e-enabled models for: education, research and applications, all based on the premise of “local Problem-centric Subject Matter Expertise, empowered by an e-based global technological infrastructure of tools, proven and certified solution component libraries, and other resources. The other key concepts are the Internet of Vital Things (IoVT), and the extension of Vital Electronics development framework to the IoVT through Vital iSolve. Based on the above: Our team is currently engaged both in the US, EU [Poland] and around the world [Ukraine, India] in pursuing the concept of e-Wellness especially in the context of an aging population. A number of us, have recently presented some of our work in a paper, ‘The Flexible Fractal Network as a Foundation for Enhanced

**Have social implications and responsibility members sit in on other working groups**
Tagged: 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

“Current working group structure separates the discussions of faculty appointments, organizational structure, curriculum development, and computing infrastructure from the discussions involving ethics. If the College of Computing (CoC) is to fully embrace ethics, ethical considerations need to be addressed directly within the other working groups. Having the ethics working group members able to sit in and speak in the other working groups will better ensure ethics is represented in the decisions the CoC makes.”

**Launching Social Media Companies**
Tagged: Organizational Structure Working Group
Faculty Appointments Working Group
Curricula and Academic Degrees Working Group

“It seems to me that MIT people have not been founders of many of the now huge social media companies. We have the Media lab, which would seem to be able to generate ideas in this area, and we obviously have the programming prowess. Given the huge value and impact of social media companies, it seems that MIT might make an effort to be more on the forefront of this area.”

**Is computing a tool or an academic discipline?**
Tagged: Organizational Structure Working Group
Faculty Appointments Working Group
Curricula and Academic Degrees Working Group
“I hope that world-class computing is used and improved and supported, as an essential tool of education and research in all five schools of MIT. This seems to be the vision that Rafael Reif expressed. Tools, however, are very different from academic disciplines. The idea of a ‘Minor in Computing’ worries me. When learning just how to use the tool becomes the objective, universities become trade schools for recruitment by corporate employers and VCs, and the students, with their limited time in our care, are cheated from learning more fundamental and broader intellectual skills. Every trade-school elective takes time away from other courses. By all means, continue doing Course 6 academic research in AI, robotics, computational mathematics, etc! But I hope the Schwarzman College supports our fundamental and millennial academic mission rather than diluting it.”

Interaction with Industry

Tagged: Organizational Structure Working Group

“I propose a mode of interacting with industry that will encourage greater participation from both new and existing industry sponsors, support the new College, and leverage existing DLCs and their faculty. There’s no shortage of membership and sponsorship models across the Institute; many of them are related to the topics of AI, computing, and ethics. Rather than compete and potentially leave money on the table, I suggest we lift all boats by building a corporate engagement model for Schwarzman that has 2 components: One is unencumbered consortium funds (say, $250,000 per year) going to Schwarzman to fund its various activities (supporting students, events, research, etc.). The other is company-directed funds (an additional $250,000 per year) for research or membership in specific AI/Computing-focused DLCs from any part of campus that the company is interested in - companies choose the topics, research, and faculty of their choice; they can choose any combination and get credit for existing relationships. This way, we reduce switching costs, friction, and can leverage existing models and relationships to bring more funds to campus.”

Provide support for research software development and maintenance

Tagged: Organizational Structure Working Group, Computing Infrastructure Working Group

“Dedicated research software engineers to help in projects. Dedicated software documentation writers. Provide git server, software testing infrastructure.”

Adequate administrative support will be critical

Tagged: Organizational Structure Working Group

“As with many of the exciting initiatives, centers, international collaborations, Quest, Solve, and now, the College of Computing, raising a generous budget for
staffing and administration will be key. So many administrative units are short-staffed, have high turnover, and rely on longtime members of the administrative staff to step in and take the work of multiple positions. When the College will be hiring new faculty, have bridge faculty, and be as expansive as envisioned, the need for administrative support will be great in all areas of the College. Although "administration" is not sexy, and donors don't endow admin positions, a commitment to excellence includes committing to all of the "invisible," non-research, non-teaching positions (HR, budgets, compliance, safety, management, providing support and service to students service, etc.) that make the Schools at MIT work and allow the faculty to remain focused on their teaching and research. Thank you for the opportunity to comment.”

Multiple Flavors of Computation GIR

Tagged:
Organizational Structure Working Group
Curricula and Academic Degrees Working Group

“Computation is ubiquitous to the point that everyone leaving MIT should have at least some experience with it and it is now part of being a well-rounded scientist or engineer. However, it is unique in that the value to most people comes when it is applied to their field, as opposed to general knowledge. Thus, I propose that each Department be allowed to offer one (vetted) subject which can fulfill a new Computation GIR, which teaches computational thinking/programming in the context of that Department.”

Researching Around

Tagged:
Organizational Structure Working Group

“To my understanding, the leading team is welcoming disruptive ideas that could be maybe implemented in a cutting edge organization such as MIT Stephen A.Schwarzman College of Computing. To this extend, I like very much the idea of breaking with the traditional academic method of subject, grades, credits, etc. Instead, we could use the project methodology using a subject (that will be chosen every academic year) as common thread. This topic will be used for guiding students through the academic learning and research:

- Data acquisition: population statistics grow, trends, etc
- Trends, correlations, statistics, etc
- Big data, database management
- Artificial Intelligence (AI): life improvement for senior people
- Robots: to care sick people, mobility, etc
- Communication: IoT, smart cities, etc.
• Social implications, ethics, IT tools to assist to elders to manage their assets, etc

Very interesting outcomes will be found working cross-disciplines: linking social with AI or smart cities with statistics. In addition to that, conferences, working groups, activities, etc can be organizing around the selected topic. Traditional subjects like programming, computing, maths, algebra, etc will be embedded in this common project named ‘Population Aging: how to improve senior lives.’ Program will change each year and the syllabus will be done together by professors and students.”

**Ethics and Education Training for all College of Computing Faculty**

Tagged:
Faculty Appointments Working Group
Social Implications and Responsibilities of Computing Working Group

“To ensure that every subject taught and all research done is based on careful consideration of the ethical and social implications, all faculty, students, and researchers must be properly trained. As leaders of our academic and research community, it will be up to faculty to ensure that such standards are upheld. Though they may have an understanding of the ethical considerations in their field, or at least the rules governing research, faculty are often unable to convey the importance of these considerations to their students. We should leverage the ethical, social, and educational expertise spread across our campus to design a thorough training for new college faculty that brings them up to speed on the social issues facing their field, best practices for teaching and mentoring, and other interpersonal skills they need to serve as effective role models for their students. To the extent that this can be scaled, certain pieces of this training should be passed on to UROP mentors, teaching assistants, and other graduate and undergraduate student leaders.”

**Create an institutional review board to evaluate any negative impacts of research on people**

Tagged:
Faculty Appointments Working Group
Social Implications and Responsibilities of Computing Working Group

“Currently the working groups don’t have any boundaries which the task force has asked them to abide by. While this open structure has benefits, it also might allow conflicts of interest and other bias to hamper the best recommendations from coming out of the working group. For example, most of the faculty on the working group for faculty hiring likely have a vested interest in department autonomy in the process (and possibly getting more faculty in their department), which can shut down innovative solutions which challenge the status quo. If the steering committee provides working groups with constraints outside the status quo, like is being done for the housing process in undergrad dorms, more creative solutions can be created (see URL of tech article about the process). For example, asking the faculty hiring committee to come up with ideas of a faculty hiring structure which does not
involve department or college level hiring decisions could yield some creative ideas about how to balance power while ensuring MIT obtains adequate skills. Or for the organizational structure working group, asking for recommendations to a structure given that it requires less than X number of full time administrative staff (or some other optimization constraint).”

Steering committee should put constraints on working group brainstorming & final suggestions

Tagged:
Organizational Structure Working Group

“MIT currently has an institutional review board, called COUHES, for determining whether research that is detrimental to participants in human studies, and suggesting improvements. This does not cover the impact of research on the wider community. MIT should have some sort of structure which assesses research projects’ societal impact, and recommends revisions to proposals with some threshold probability of negatively impacts certain groups of people. This process needs to be holistic and transparent, taking into account the funding source, and whether the funders can utilize the research outcomes in an unscientific way to prevent necessary change for key UN sustainable development goals, and also accounting for how a project might restrict or expand the research expertise of MIT students, since research projects can sometimes prevent MIT students from gaining skill sets that help them impact the wider community.”

Change faculty hiring so that MIT can tackle complex ethical and sustainable development challenges

Tagged:
Faculty Appointments Working Group
Social Implications and Responsibilities of Computing Working Group

“Current faculty appointments at MIT are department based, where discipline specific expertise are valued over the skills required to bring multiple fields together to solve larger problems. This was highlighted in a recent faculty report regarding MIT’s Climate Action Plan: ‘[The institute] has an extremely limited number of faculty members who have the proficiency and experience to address the enormously wide range of complex issues involved in climate change as well as a willingness to lead or participate in demanding interdisciplinary studies of these matters.’ In order for MIT to be have the skills to solve complex issues like the ethics of AI, climate change, or any number of complex, interdisciplinary problems, we need to have faculty with experience bridging these divides effectively. MIT as an institute should determine a list of sustainable development challenges (similar to UN sustainable development goals), gather statistics about how well the institute can currently address these goals, and use this information to drive institute hiring of faculty (with the ability to veto department choices). I recognize this is a huge shift of power, but President Reif said that this college will reshape MIT, and some of that will require radically changing the decision making structure to better serve
the institute and the world.”

**Behavioral attributes of chosen faculty**

Tagged:
Faculty Appointments Working Group
Social Implications and Responsibilities of Computing Working Group

“Since the core idea of the College is to connect those who advance computer science with those who use computational tools we should find faculty candidates with a track record of interdisciplinary collaboration and with high recommendations from former students outside the field of computer science.”

**Incorporation of justice-based inquiry into College of Computing pedagogy**

Tagged:
Faculty Appointments Working Group
Curricula and Academic Degrees Working Group
Social Implications and Responsibilities of Computing Working Group

“I hope that the working groups working on pedagogy, faculty appointments, as well as the social implications and responsibilities of computing all consider building a focus across the school on questions of justice and bias in computing. MIT already has individuals here who are working on these questions (Sasha Costanza-Chock comes to mind as one expert). If there are ways to draw on this expertise and build a curriculum that includes ethics, bias, questions of race/gender/sexuality and draw in faculty who have a vocabulary in these areas, that would be excellent. It is an important time to think critically about data, and would be exciting if MIT could be at the forefront of ethics questions around computing as well as the more technical aspects. Additionally, it would be interesting also if some big-picture social and environmental issues were incorporated into the curriculum, so that students could learn and test skills while also applying them to important challenges of our time.”

**Course Idea**

Tagged:
Curricula and Academic Degrees Working Group

“Studying AI/Technology Ethics through the TV show Black Mirror.”

**Text on liberal arts and computing**

Tagged:
Curricula and Academic Degrees Working Group

“Dear Co-Chairs Devadas & Van Voorhis and Committee Members, I am an MIT Media Lab alum (SM ’94 and PhD ’00) intensely interested in the development of the Schwarzman College of Computing curriculum. As you design the curriculum for the College, I hope you have the opportunity to consider a book I just published
https://mitpress.mit.edu/books/software-arts The crux of the book is to explain the
role of the liberal arts in computing and vice versa. Please let me know if I can ask
the Press to send you copies of the book. I attach here the PDF accessible via IEEE
Explorer.”

Create Logic for Course Numbering

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Curricula and Academic Degrees Working Group

“6-1 currently means SB in Electrical Engineering, and 6-2 currently means SB in
EECS. But compared with the course 6-7 (EECS and Bio) and course 6-14” (EECS
and Economics), the numbers ‘6-1’ could be mistaken for a program combining
EECS and Civil and Environmental Engineering (i.e. Course 6 and Course 1), and 6-2
could be mistaken for a program combining EECS and Mechanical Engineering.
Perhaps there should be conventions for naming the courses, i.e. a number followed
by a letter indicates a variation on a single coherent course of study, whereas a
number followed by another number indicates the combination between two
courses.”

More CS Master’s Programs

Tagged:
Curricula and Academic Degrees Working Group

“It will increase our diversity if we can have masters from other undergraduate
programs. Most of the universities have CS-related master’s programs.”

Have course evaluations ask about the level of ethical discussion in all courses

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“MIT currently has a course evaluation system, which essentially ‘grades’ professors
on their teaching. To motivate professors to bring up deeper ethical questions
within courses, the default course evaluation for all courses/instructors could
include a question similar to: ‘Rank how much you agree with the following: ‘The
instructor/course encouraged discussion and questioning about the ethical
implications of the subject.’ This would allow MIT to evaluate the effectiveness of
any ethics implementation in its courses.”

Increasing representation of women in computer science and software engineering

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“I was reading this article in the New York Times regarding the history of women in
I noticed that several schools (like Carnegie Mellon) had instituted gateway classes for entry into software coding that helped level the playing field for women and had significant impact on their representation within computer science majors. I was not aware if MIT has considered or implemented something like this. If not, it’s time.”

**Improving accessibility to CS degrees or similar certifications**

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“The College of Computing should offer regular, low-cost computer science courses available to the MIT and outside communities with an emphasis on helping attendees earn jobs in related fields and improving class/income mobility. I would think something in person and with the opportunity for credentials of some kind would be most effective.”

**Create an institutional review board to evaluate any negative impacts of research on people**

Tagged:
Social Implications and Responsibilities of Computing Working Group

“MIT currently has an institutional review board, called COUHES, for determining whether research that is detrimental to participants in human studies, and suggesting improvements. This does not cover the impact of research on the wider community. MIT should have some sort of structure which assesses research projects’ societal impact, and recommends revisions to proposals with some threshold probability of negatively impacts certain groups of people. This process needs to be holistic and transparent, taking into account the funding source, and whether the funders can utilize the research outcomes in an unscientific way to prevent necessary change for key UN sustainable development goals, and also accounting for how a project might restrict or expand the research expertise of MIT students, since research projects can sometimes prevent MIT students from gaining skill sets that help them impact the wider community.”

**Coordinated computing support**

Tagged:
Computing Infrastructure Working Group

“MIT provides support to groups with clusters through the MGHPCC in Holyoke. This support should be continued. I’d like to see MIT coordinate and collect ideas on computing. For many years, groups have constructed their own clusters, sought out quotes, learned how to maintain these systems. With MGHPCC through MIT’s
engaging cluster, some of this is now provided. MIT could do more in providing information resources for the scientist-compute-admins, an ala-carte set of pre-approved negotiated compute nodes and solutions that could be chosen from, and hosting community seminars on compute technologies. I do not think MIT should host its own central cluster or compute system, but rather provide the tools for groups who wish to do so.”

Computing Infrastructure at MIT should be lean, decentralized, and flexible

I would like to encourage the infrastructure group to strongly considered creating coupled scalable clusters as a computing resource at MIT. I direct the OpenMind Neuroscience Computing Cluster at MGHPCC in Holyoke. This resource serves 20 research groups comprising over 200 users. Our cluster has 70 compute nodes, comprising 3000 virtual cores, 192 GPUs (professional and consumer grade), about 2PB of storage comprising different filesystems (lustre, nfs), and each node has at least 40 virtual cores and at least 256 GB of RAM. This has been extremely useful to support the diverse needs and use cases of the neuroscience community at MIT. In addition to this cluster, my group helps maintain several informatics projects in neuroscience. Based on our experience of running the cluster for almost 5 years, and an assessment of needs I would make the following conclusions and recommendations: 1. Our current estimates of replacing the cluster with AWS services comes to a range of $8 - 15 million in credits per year. This far exceeds the hardware cost and our yearly maintenance cost of the cluster. 2. We should create multiple, connected clusters at MIT rather than single large datacenters. This allows for resilience, keeps costs lower, while allowing users to seamlessly migrate (this is not possible at the moment). 3. We have operated our cluster at roughly 0.5 FTE of a sysadmin cost + 1 FTE of support staff to interface with our users. 4. We have worked with vendors to support things like commercial GPUs, which have reduced our cost while providing similar performance to pro series. 5. MIT should coordinate purchases in a flexible manner across clusters to pool resources and drive better prices. 6. Cloud options should be available whenever we do need to avail of them. We have been trying to figure out a way to spill over to the cloud, but that has not been easy from a mechanistic implementation perspective. 7. User education and training are as important as hardware. For example, we have moved our community to use container technologies (e.g., Singularity) on our HPC system. 8. There is never a one size fits all. I love the fact that MIT is decentralized, but targeted centralization can make the most out of decentralized pieces.”

Centralized computing infrastructure

“Research computing infrastructure--including a cluster with both compute nodes and backed-up storage space--is needed at MIT. This is particularly problematic in
genomics and other disciplines of computational biology, which require intermittent bursts of computational power (generally lots of jobs, each of which does not need particularly high-octane hardware). While commercial cloud computing solutions are useable in theory, they are not designed for research computing, are expensive, and are clunky compared with computing clusters like Harvard’s Odyssey. High-performance computing solutions available at comparable institutions make it easy to use common software, integrate computing and storage, and minimize cost with sophisticated priority queuing systems. While I have been able to find computing solutions because the nature of my research program depends on it, MIT ought to encourage the use of computing by non-experts, across the Institute, by lowering the structural boundaries to analyzing and backing up large data.”