

From: Scott Strobel <scott.strobel@message.yale.edu>
Sent: Wednesday, October 23, 2019 11:01 AM
To: Yale Faculty
Subject: Yale's science implementation: update on our early progress

Dear Colleagues,

President Salovey asked me to provide the community with an update on our efforts to strengthen science and engineering across the university. The University Science Strategy Committee (USSC) carefully considered how incremental investments could create an enduring environment for scientific excellence and how research programs distributed across the university could find thematic connections. The report was submitted to President Salovey in June of last year. In November, the President **endorsed the recommendations of the USSC** with some adjustments in emphasis and breadth. In the past several months, faculty and staff across the university have worked collaboratively to make significant progress toward the recommendations identified in the USSC's report.

While we have been working hard to give these ideas shape, Yale's Office of Development has, in turn, been doing its part to get the work funded. The early results have been excellent: Yale has already raised over \$100 million in commitments to support implementation of the USSC recommendations. Our success in attracting donor interest is coming directly from the compelling story we are able to tell—highlights of which I offer here.

Investments that cut across all of science and engineering at Yale

The USSC recommended investment in four cross-cutting initiatives that will strengthen and empower science and engineering research across the university. Peter Schiffer has been leading the efforts in these areas. In the last year, we have

- **Increased funding for university fellowships** in science and engineering by approximately \$1.7M per year (more than a 10% increase) and provided almost \$300,000 more to supplement stipends for graduate students who earn outside fellowships. This effort, guided by Lynn Cooley, is a significant ongoing commitment toward the support of graduate students;
- Invested more than \$4 million in **instrumentation for core research facilities** across the university. The equipment was identified through a competitive application and selection process, organized by Lisa D'Angelo. This equipment will support a diverse range of scientific work on campus including cryo-electron microscopy, cell sorting and microscopy, and materials manufacturing;
- Launched the annual **Yale Day of Instrumentation** to build community among the instrumentation developers on campus. These efforts were led by Karsten Heeger, who also created regular **instrumentation lunches** that bring together investigators from diverse fields to discuss the frontiers of instrumentation creation.

- Promoted diversity throughout the STEM pipeline through the [Faculty Excellence and Diversity Initiative](#), the [Emerging Scholars Program](#), and the [Science, Technology and Research Scholars Program](#), under the guidance of combined leadership from across the university. Rick Bribiescas and Gary Desir built upon the longstanding success of the Minority Organization for Retention and Expansion (MORE) in the School of Medicine with an inaugural MORE Yale event on Science Hill.

Integrative data science, computer science, and their mathematical foundations

The USSC repeatedly heard from all sectors of the campus, both within and outside the sciences, about the important role that data science is playing to transform their intellectual fields. As a result, the emphasis on data science provides a foundation upon which a diverse range of the academic enterprise can be strengthened and empowered. The original recommendations identified integrative data science and its mathematical foundations as an area for priority implementation. Subsequent discussions over the past several months have made clear that our investment in data science must also embrace disciplines in computer science. These fields are complementary and synergistic. Both provide powerful tools to improve and inform work throughout the university and scientific and technological development around the world.

To fulfill the goals of the USSC recommendation in data science will require significant expansion of facilities on both Science Hill and the Medical School to create additional opportunities for integration and colocalization with other relevant domain areas. These proximities will encourage new collaborations and ideas. We will begin renovations in Kline Tower this spring to create a space that is worthy of the talent and aspirations of our initiatives in this broad area. The renovated building will include not only classrooms and a home for academic departments, including Astronomy, Math, and Statistics and Data Science, but also additional space for a multidisciplinary data science institute. We are also exploring opportunities for biomedical data science in the 100 College Street building. While these facilities are being planned, Jeff Brock, Tamar Gendler and Robert Alpern have been working with departments in SEAS, FAS, and the Medical School to recruit faculty members who can transform their fields and increase our teaching capacity in this priority area.

These efforts will include fundraising for new faculty slots and other enabling projects. We have already enjoyed early success in these efforts. A generous donor has provided a gift that will help launch the data science initiative.

Quantum science, engineering, and materials

Yale is an indisputable leader in quantum science, engineering, and materials. Our colleagues in this area created the first electronic quantum processor and continue to transform our understanding of these fields. To further enrich the pool of talented faculty members on campus, four new searches are now underway in this area across engineering, FAS, and West Campus, three in quantum information and one in quantum devices. This complements three hires last year in the area of quantum materials. Thanks to the generosity of an anonymous donor, incremental half slots will be available in the years ahead for partnering departments across the university to expand research and scholarship in the quantum sciences.

Yale already has the very successful Yale Quantum Institute, which is focused on quantum information and the advancement of quantum computing. In the coming year, we will create a parallel institute for quantum materials, and a structure to coordinate the work of the two groups.

The USSC identified laboratory space as a significant constraint on our growth in the quantum sciences, and in the physical sciences and engineering more broadly. We are currently exploring the feasibility of constructing a new physical sciences and engineering building to relieve this constraint.

Neuroscience

Neuroscience at Yale encompasses a diversity of approaches to answer fundamental questions about what makes us human. It explores how we think, feel, and perceive, with the goal of improving physical and mental health and optimizing brain performance. The work in this field spans dozens of departments and extends from the Medical School to Hillhouse Avenue to Science Hill. The USSC repeatedly heard a common theme during discussions with faculty members conducting research in this area: there is a need for a central space that co-locates strengths across the university. To address this challenge, this year Yale leased six floors of 100 College Street, adding over 240,000 square feet of laboratory and office space. This is comparable to the amount of space added by the recently completed Yale Science Building.

This building gives us a remarkable opportunity to develop intellectual adjacencies and create exciting new research collaborations across the neurosciences. A faculty committee chaired by Daniel Colón-Ramos is considering proposals for multidisciplinary research clusters in neuroscience that could take advantage of the space in 100 College Street. This building will become a nexus for our neuroscience community which, by necessity of its size and breadth, will continue to thrive in multiple locations.

Other Initiatives

We continue to work with our colleagues across campus on the Inflammation priority, as well as on Planetary Solutions, which frames the goals of the Environment and Evolution and Climate Solutions priorities identified in the USSC report. We will provide updates on those activities in the near future, but I am excited by one recent development in this area. The Yale Institute for Biospheric Studies, under the leadership of Michael Donoghue, has initiated a multidisciplinary G.E. Hutchinson postdoctoral and visiting scholars program to support research across a broad array of environment- and climate-related topics.

Since taking responsibility for planning, implementing, and fundraising for the USSC recommendations in May of this year, I have learned a great deal. First, I learned that the progress on the USSC recommendations is built on a base of unprecedented investment in science. For example, since 2013 the university has spent half a billion dollars on new buildings and renovations on Science Hill alone, with additional investments in the medical campus and West Campus. This includes the opening of the Yale Science Building, a facility that many of us have waited anxiously to see constructed for many years. Second, I realize that the developments highlighted above occur against a backdrop of cutting-edge research in all areas of science, engineering, and medicine across campus. The University's research mission is not defined by just five priority areas. Research excellence is found in a broad variety of laboratories, all of which inspire curiosity about the natural world. Examples of the important work being done in [science and technology](#), and [health and medicine](#), and across a range of disciplines, are available on Yale News.

In the past months, I have been fascinated by the breadth and depth of the research across campus. I have been impressed by the generosity of our alumni and friends. And I have been inspired by our faculty, our staff, and our students, whose work holds the promise of changing the world for the better.

I am grateful to the many people across campus whose efforts are turning recommendations into reality. We have a great deal more to do; for that reason, I hope you are as motivated as I am by the early successes we have enjoyed. I look forward to providing further updates on our work together.

Sincerely,

Scott Strobel
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Vice Provost for Science Initiatives
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