Within the next decade, information at Caltech will be a unifying, core intellectual theme spanning the physical, biological, and social sciences, and engineering. Such a formidable, collective leap forward is the result of two idiosyncrasies: Caltech’s long-standing and imaginative blending of traditional disciplines and the low one or two degrees of separation between disciplines, faculty, and students which allows exceptional people from seemingly disparate fields to work together naturally. Put another way: we’re fabulously small, we engage in a lot of scientific gossip, and the standard departmental boundaries are all but invisible around here.

ISTI’s interdisciplinary research, academic, and outreach agenda is large and will develop roots in each of Caltech’s six divisions, with participation of more than 20% of the faculty, and nearly 35% of all students through curriculum. We aim to create a common language for the study of information, one that will stimulate fundamentally new thinking about problems facing not only the usual suspects (computer science, quantum physics, electrical engineering, applied physics, and applied mathematics) but also those not normally associated with information science and technology such as experimental economics, pure mathematics, and developmental biology. By approaching information science and technology from multiple levels of abstraction, we’d also like to figure out new tricks for atoms, light, molecules, cells, circuits, algorithms, and networks.

What will be the outputs? Absolutely smashing scientific and engineering discoveries, students who’ll go out into the world and (we hope) one-up their thesis advisors, and technological advances only yet imagined in our wildest dreams…

Such an ambitious program will involve two phases. The first is the creation of the research component, the wellspring from which the corresponding academic and outreach programs of the second phase will flow. And we need look no further than three words—multidisciplinary research center—for the formal mechanism for bringing people and their ideas together from each of the “six corners” of the Institute.

Over the last year, in an effort to define and help grow an IST community at Caltech, groups of faculty convened, conferred, and converged on a set of unifying principles for four new research centers that together provide the critical mass necessary to launch ISTI. Jehoshua (Shuki) Bruck, Gordon and Betty Moore Professor of Computation and Neural Systems and Electrical Engineering, chaired the IST Faculty Planning Committee, which issued its final recommendations in early January. The proposed centers, ultimately to be housed in a new building, are the Center for Biological Circuit Design (CBCD), the Center for the Physics of Information (CPI), the Social and Information Sciences Laboratory (SISL), and the Center for the Mathematics of Information (CMI). These four new centers will join the established Lee Center for Advanced Networking and the NSF Center for Neuromorphic Systems Engineering to form the initial core of ISTI. As ISTI matures, research advances and the natural dissolution of older research initiatives will drive the creation of new centers.

From these vibrant centers will emerge a unique academic program, the first of its kind in the country. The new undergraduate and graduate programs will combine engineering and science with a clear focus on information, and direct exposure to the central issues across the entire intellectual landscape. And finally, to create the broad societal impact commensurate with the outstanding research and academic components of ISTI, we will design and conduct a highly visible outreach program. Through executive, visitor, and industrial affiliate programs, we hope to supplement and share Caltech’s contributions by collaborating with members from key academic institutions, government, and industry. Workshops, lectures, and summer schools will round out the menu for the continuing revolution in information science and technology.

Listen in on the following four conversations among Caltech faculty engaged in thinking about what these new centers will bring to Caltech and society at large, as Caltech embarks on this unparalleled and profound exploration.