

The University of California, San Diego (UCSD) respectfully requests a leadership gift of \$7.5 million from The [] Foundation to establish a Brain and Mind Institute. A gift of this magnitude will launch a broad initiative that will hasten important discoveries and create a formal structure to facilitate collaborative research across the University and at renowned neighboring research institutions. Unhampered by conventional boundaries, it will have a global reach and the capacity to transform scientific understanding of the components that make up the very core of our humanity.

By providing the lead gift to inaugurate a campus-wide brain and mind initiative, The [] Foundation will be a highly influential contributor to UCSD's first comprehensive campaign, which seeks to raise \$1 billion by June 2007. The gift will be a powerful and visible example for other donors, encouraging them to invest in neuroscience research at the University and beyond.

In recognition of The [] Foundation's exceptional vision and in grateful acknowledgment of its generosity, upon approval by the President of the University of California, UCSD will be honored to name the institute the [] Brain and Mind Institute at the University of California, San Diego.

1. MISSION AND GOALS

The Scientific Mission of the Proposed [] Brain and Mind Institute ([]BMI)

The [] Brain and Mind Institute at UCSD will lead the world in understanding the origins, evolution and mechanisms of human cognition, from the brain's physical and biochemical machinery to the experiences and behaviors called the mind. Drawing on parallel strengths in both molecular/cellular and behavioral/cognitive neuroscientific research, as well as a tradition of interdisciplinary investigation, the []BMI will transcend traditional disciplinary barriers to foster new discourse among top scientists, accelerating discoveries about the connections between mechanism and behavior. []BMI will leverage the University's preeminence in such fields as neuroscience, biology, cognitive science, psychology and medicine, along with the extensive resources of the broader La Jolla scientific community, to extend its position as the pacesetter in collaborative brain-mind research and education, and as a vibrant hub for dissemination of its discoveries to advance science and benefit humankind.

Advancing the Mission through Establishment of the [] Brain and Mind Institute

Over the past decade, the field of brain-mind research has mushroomed to encompass vast areas of science. Recent breakthroughs in genetics, imaging, computation, linguistics, physiology and biology promise to dramatically speed up the creation of new knowledge, and it is generally acknowledged that research into the complexities of the brain-mind connection will have to become increasingly interdisciplinary if it is to yield the profound insights that scientists seek.

UCSD, with its strengths in each of these areas, as well as its culture of collaboration, is uniquely positioned to be a major catalyst in this process of discovery. The University has a long history of projects that span traditional disciplines and include investigators at prestigious neighboring research institutions. For example, UCSD has more organized research units (multidisciplinary by definition) than any other campus in the UC system. Its Neurosciences Graduate Program, ranked #1 nationally by the National Research Council, includes faculty from more than a dozen campus departments, the School of Medicine, the Scripps Institution of Oceanography and various local institutions, including the Salk Institute, The Scripps Research Institute, The Burnham Institute and the Veterans Administration Medical Center. Between 1979 and 1984, a grant from the Alfred P. Sloan Foundation allowed the University to foster dialogue between senior faculty, visiting faculty, graduate students and post-doctoral fellows in economics, neuroscience, psychology, linguistics, physics and

engineering. This interaction led to the creation, at UCSD, of the world's first Department of Cognitive Science, as well as the new field of artificial neural networks.

The [] Brain and Mind Institute at UCSD ([]BMI) will serve as a much-needed catalyst for integration of brain-mind research activities at the University and its neighbors, providing the channels for scientists from diverse academic backgrounds to communicate and work together more effectively across disciplines. As investigators working on the molecular and cellular levels increasingly join forces with those working on the behavioral and cognitive levels, all will routinely be able to approach important and complex problems from several perspectives, and their efforts will gather momentum as they address central questions of the field:

- How do particular genetic programs construct the nervous system?
- How does this genetic activity ultimately give rise to behavior?
- How do brains repair themselves?
- How do the mechanisms of memory relate to the experience of remembering?
- What are the neural bases of learning, consciousness, feeling, memory and attention?

The answers []BMI scientists find may lead to advances ranging from the ability to intervene in individual cases of mental disease, learning impairment or emotional trauma, to the development of new approaches to collective social interactions in everything from education to war.

Goals

- Create a formal structure for brain-mind research at UCSD and the broader community that will establish new lines of communication between scientists from disparate fields and connect them with critical resources and infrastructure, give them a broader perspective and strengthen the cross-disciplinary linkages that are essential to accelerate the rate of discovery in the neurosciences.
- Train future generations of brain-mind researchers who will seed interdisciplinary research efforts in neuroscience at institutions across the nation and around the world.
- Initiate projects and provide seed grants to brain-mind researchers to pursue unconventional lines of investigation that have the potential to lead to major breakthroughs.
- Disseminate advances in brain-mind research to an international audience and promote dialogues that will advance research around the world.

2. ACTIVITIES OF THE [] BRAIN AND MIND INSTITUTE

Promoting Interdisciplinary Research

- **Interdisciplinary training programs:** Before researchers from different disciplines can work together productively, they must develop a shared vocabulary and gain understanding of their respective methodologies. To facilitate this process, the []BMI will sponsor a series of intensive training programs for faculty, research staff, graduate students and post-doctoral fellows. Similar to academic "boot camps" in their concept and intensity, these demanding workshops, seminars and short courses will immerse participants in disciplines outside their primary field of expertise and give them the tools and experiences they need to gain fluency and interact with their peers in those disciplines. In time, these intensive training programs will be replicated and offered at other institutions.

UCSD has had considerable experience using “boot camps” to facilitate cross-disciplinary training. The same approach was instrumental in creating the field of artificial neural networks, when there were few experts and many people who wanted to learn from them. In addition, each summer, students entering UCSD’s Neurosciences Graduate Program hone their skills in specific areas by taking part in similar rigorous workshops.

- **Faculty recruitment:** The University will provide two new faculty positions for scientists who will be affiliated with the []BIMI. Although UCSD has an abundance of stellar faculty in brain-mind-related fields, a unique synergy develops when new investigators enter the mix. Their continuing presence will help catalyze and extend the collaborative process within the []BIMI.
- **Exchange programs:** The process of intellectual cross-pollination will be advanced further through an inter-institutional visiting faculty and exchange program. UCSD faculty will visit other institutions, and key faculty from other institutions will come to UCSD to share their knowledge and gain new perspectives. Global in scope from the outset, the program will provide support for a variety of experiences, such as working in another lab, learning a new technique or completing a research project.

Preparing Future Researchers

In order to give the next generation of investigators experience with interdisciplinary neuroscience research, the []BIMI will provide support to graduate students and postdoctoral fellows to conduct research in other labs locally and around the world. These funds will allow recipients to work in a variety of academic areas, preparing them for careers in which they will seed interdisciplinary efforts at other institutions.

Enhancing Infrastructure

Capitalizing on UCSD’s leadership in the area of high-speed computing and wireless communication technology, and the unique infrastructure provided by the San Diego Supercomputer Center and the California Institute for Telecommunications and Information Technology, the []BIMI will create a real-time telecommunications and data network that will serve as a backbone for the Institute and facilitate communication between researchers at UCSD and other institutions. The network will make connections virtually that would be difficult to make geographically—for instance, enabling members to participate in talks, seminars, lab meetings and conferences from remote sites via live walls (large screens) and the Internet. The network will also facilitate inter-institutional research collaborations.

In addition, [] funds will help support shared core facilities that can be used for training and research by scientists from multiple disciplines. The first of these will be the Brain and Imaging Analysis Facility, established at the Center for Functional MRI in the W.M. Keck Building. This facility will allow researchers from different fields to be trained in the cutting-edge imaging technology available at the Center for Functional MRI. The Institute will also help underwrite the cost of imaging at the center for []BIMI researchers.

Supporting Nontraditional Research

There is a critical need for seed money that can be used for innovative research. The []BIMI will provide interdisciplinary research grants to participating faculty and initiate projects to develop new avenues of inquiry, making it possible for investigators to research questions that could not otherwise be addressed. As scientists develop promising concepts, they will then be able to attract extramural funding. Since federal funding is crucial for other kinds of research, another major role of the []BIMI will be to facilitate and support the generation of proposals to funding agencies.

Reaching Out

[]BMI programs will attract the world's top researchers in brain- and mind-related fields by sponsoring a series of symposia on leading-edge topics in the field. There will be international symposia every two years, which will be designed, like the Institute, to bring together scientists who might not ordinarily interact. In addition, virtual symposia will be offered via the Internet. With these online, interactive symposia, researchers from around the world can "attend" in real time from their own offices and cross-fertilize research efforts at the []BMI and institutions around the world.

The []BMI's Web site will function as the "front end" and the Institute's public face. It will document []BMI activities and provide the public with access to archived talks, symposia and multimedia demonstrations. It will also function as a point of contact for media and news access.

3. PARTICIPATING FACULTY

Members of the []BMI will be drawn from an illustrious group of researchers from UCSD and neighboring institutions, representing more than 20 academic disciplines and all aspects of brain and mind research (see Attachment A). Many are National Academy members or recognized nationally and internationally in their fields; junior faculty are among the most promising in the world. Furthermore, UCSD has entered a phase of dramatic expansion and will be recruiting 75 new faculty members per year over the next seven years, with an emphasis on leadership in cross-disciplinary initiatives. Additional []BMI members will be drawn from these new faculty.

4. INTERDISCIPLINARY INTERACTIONS ACROSS THE UNIVERSITY AND BEYOND

In addition to implementing the many new interdisciplinary activities described in section 2, the Institute's leadership will propose that the []BMI to be designated an organized research unit (ORU). An ORU is an academic unit that provides a supportive mechanism for interdisciplinary research. This designation will underscore the []BMI's role in promoting cross-disciplinary collaborations.

5. GOVERNANCE

The governance of the []BMI will reflect its disciplinary and geographic range. UCSD's Senior Vice Chancellor for Academic Affairs, Marsha Chandler, will provide overall leadership and guidance and have ultimate responsibility for the Institute. Nicholas Spitzer, Professor of Biology and Section Chair of Neurobiology, and Jeffrey Elman, Professor of Cognitive Science and Associate Dean of UCSD's Division of Social Sciences, will serve as co-directors. Both are leaders in their fields: Spitzer is a member of the American Academy of Arts and Sciences and a councilor of the Society for Neuroscience. Elman is a pioneer in the field of artificial neural networks and a fellow and past president of the Cognitive Science Society. They reflect in their backgrounds the two poles of the Institute—brain and mind—and will ensure the []BMI's interdisciplinary breadth. Together they will be responsible for the day-to-day administration of the []BMI, including administering the budget, hiring staff and overseeing the design and implementation of the projects and activities described in section 2. They will interact with the Institute Board, serve on the Executive Committee (see below), and provide oversight of the faculty recruitment process, in collaboration with the hiring departments, to fill the two new faculty positions.

The Institute Board will consist of a select group of distinguished scientists with broad disciplinary representation, from the participating departments and nearby institutes. Meeting monthly, it will provide direction, coordinate interdisciplinary and inter-institutional activities and advise the directors

on funding allocations. The board will also plan the symposia, select the recipients of []BMI's seed grants for nontraditional research and coordinate access to core facilities. Ongoing governance of the Institute will reside with the Executive Committee of the board, which will be made up of the two co-directors, as well as Paul Drake, Dean of the Division of Social Sciences; Jack Dixon, Dean for Scientific Affairs, Health Sciences; and Eduardo Macagno, Dean of the Division of Biological Sciences, who will serve as chair.

An International Scientific Advisory Board, made up of leading researchers in brain and cognitive sciences, will provide intellectual oversight. The board will conduct an annual review of the Institute's activities and will provide the directors and Executive Committee with feedback regarding both the []BMI's governance and its progress in carrying out its mission. These individuals, who will not be directly connected with ongoing activities in the Institute, will be renowned for their contributions to the study of brain or mind, and will likely include many members of the National Academy of Sciences.

Attachment B includes a list of the proposed Executive Committee and Institute Board members; Attachment C provides biographical sketches of the co-directors.

6. FINANCIAL PLAN

The following financial plan is based upon receiving The [] Foundation's \$7.5 million leadership gift at the outset of the program, via a gift to the UC San Diego Foundation. After the University's one-time 4% administrative fee, applied to all gifts, 85% of The [] Foundation gift will be set aside as a permanent endowment to provide annual income to support the []BMI's activities described in section 2. A portion of the return on investment will be reinvested as a hedge against inflation (see Attachment D for UC San Diego Foundation's endowment investment and spending policy); \$1 million of the gift will be used during the first few years to ensure a successful startup of the new program. UCSD anticipates leveraging The [] Foundation gift by raising additional private funding to help support some of the initiatives described in section 2. If [] Foundation funding is phased in over a period of years, the University anticipates being able to retain only two thirds of the gift in endowment, with the remaining portion used to support programs until the endowment is fully funded. UCSD looks forward to working with The [] Foundation to develop the particulars for this endeavor.

In-Kind Commitments by UCSD

- UCSD will provide space in the new Natural Sciences Building to serve as the administrative center for the new Institute.
- Key resources available to the []BMI include: the Center for Functional MRI, the San Diego Supercomputer Center and the California Institute for Telecommunications and Information.

Direct Financial Support:

UCSD is strongly committed to providing substantive support to ensure the enduring success of the Institute. This will include:

- New faculty: UCSD will provide the base salary for the two new faculty members. It is anticipated that over seven years, many other new appointments will be available to support Institute-related activities and many will become Institute members.
- Release time for co-directors from existing responsibilities will be provided to support the leadership of the Institute.
- UCSD will provide direct funding in support of basic administration, including salary for the Institute's management services officer.

- Through *The Campaign for UCSD*, the University is poised to generate significant support to advance programmatic initiatives in brain-mind research and education. The divisions of Biological Sciences and Social Sciences have both established brain-mind initiatives as major campaign goals, and a portion of development officers' time from these areas will be dedicated to securing support for brain-mind programs.

Support Leveraged from Public and Private Sources:

- The []BMI's seed funding and the initiation of innovative approaches to research in all likelihood will result in significant new contracts and grants, which will play a major role in increasing ongoing support of brain and mind research. UCSD currently ranks fifth in the nation in federal contract and grants expenditures. Innovative activities of the []BMI will provide numerous opportunities for new funding in this category. The Institute will also seek postgraduate and graduate training grants from the major national agencies.

7. VISIBILITY OF THE [] BRAIN AND MIND INSTITUTE

The [] Brain and Mind Institute at UCSD will be a highly visible entity from its inception. The University will publicize its creation with a major announcement to local and national media and will run articles in its own campus publications. The Institute's inauguration in academia will be marked by the [] Brain and Mind Institute's First International Symposium, which will establish the []BMI as a new leading world center in the study of brain and mind sciences. There will be continuing publicity associated with []BMI symposia, conferences and training programs. The Institute's Web site will play a large role in promoting the visibility of the []BMI by making many of its activities, such as the virtual symposia, available to the public.

Furthermore, the work of []BMI members themselves will generate ongoing visibility. As researchers achieve major goals connecting the brain and behavior, the University will publicize these discoveries in the national media; members' discoveries will also be covered in the academic press. The [] Foundation's role in establishing and supporting the []BMI will also be acknowledged in press releases related to discoveries by []BMI members, fellows and scholars.

8. FACILITIES AND RESOURCES

The []BMI will build on a wealth of facilities and resources already in place at UCSD, such as the Center for Functional MRI, San Diego Supercomputer Center and California Institute for Telecommunications and Information Technology, as previously noted, as well as the Institute for Neural Computation, National Center for Microscopy and Imaging Research, and three related teaching hospitals (Veterans Administration, Thornton and Hillcrest), in addition to members' own research laboratories and academic connections.

With the []BMI coordinating and facilitating brain-mind research efforts at UCSD, their value will be highly leveraged as researchers gain access to these facilities in ways that currently are difficult or impossible to achieve. The enhanced use of these resources, in turn, will provide researchers with new insights and opportunities, with strong potential for dramatic results.

9. LOCATION OF THE [] BRAIN AND MIND INSTITUTE

The [] Brain and Mind Institute will be headquartered at UCSD. This is the ideal location for an enterprise of this scope and ambition because it has assets that few, if any, institutions can match. In addition to ranking UCSD #1 in neuroscience, the National Research Council rated UCSD in the top

ten in psychology, biochemistry and molecular biology, developmental and cell biology, physiology and pharmacology and biomedical engineering. The unprecedented concentration of neuroscientists and cognitive scientists on the UCSD campus and at the Salk Institute, The Scripps Research Institute, The Burnham Institute, The Neurosciences Institute and the VA Medical Center will also give the []BIMI extraordinary quality and breadth. It is a community that spans fields as diverse as molecular genetics, developmental biology, psychology, cognitive science, anthropology, psychiatry, neurology, linguistics and anthropology and one that readily embraces the kind of cross-disciplinary and cross-institutional collaboration lying at the heart of the []BIMI's activities.

The physical location of the []BIMI will be in the administrative offices of the Division of Biological Sciences, housed in the new Natural Sciences Building. This building was designed to enhance interdisciplinary interaction, making it an especially appropriate home for the [] Institute.

10. TIMELINE

The []BIMI will commence full-time activities immediately following full funding by The [] Foundation. The first quarter will be devoted to organization and planning, including assembling the Executive Committee and the Institute Boards, planning the inaugural international symposium, developing the topics for the "boot camps," creating the telecommunications and data network and beginning recruitment of two new faculty. The first virtual symposium will take place during the second quarter, as will additional planning for the "boot camps," which will begin the following quarter, during summer 2004. For a preliminary timeline, see Attachment E. Again, if funding is phased in over time, then implementation will be extended accordingly.

11. AN INSTITUTE IN PERPETUITY

UCSD is committed to the ongoing operation of the []BIMI, which will build on the University's longstanding tradition of interdisciplinary brain-mind research dating back to the 1970s. The new Institute's endowment will provide stability, ensuring a permanent environment in which to foster the complex investigations of brain-mind research.

12. MAJOR NON-SCIENTIFIC CHALLENGES

The scientific challenges of the []BIMI will be inextricably enmeshed with organizational ones—in particular, the challenge of interrelating the activities of hundreds of scientists spread out over multiple institutions. This is perhaps the primary non-scientific challenge facing the []BIMI, and one that the Institute's leaders are well-equipped to address. They will set the tone for the []BIMI, extending the history of good will that exists among the different participants and building strong relationships as the collaborations evolve and multiply.

A second major challenge will be leveraging The [] Foundation leadership gift to raise additional support to expand the activities of the []BIMI. *The Campaign for UCSD* will be a significant asset in securing financial commitments for the future. It will give high visibility to the Institute and the efforts to advance it, assuring that the University is able to generate the resources needed to develop and sustain it. These challenges will be addressed confidently by UCSD with support from the highest levels of the University.