

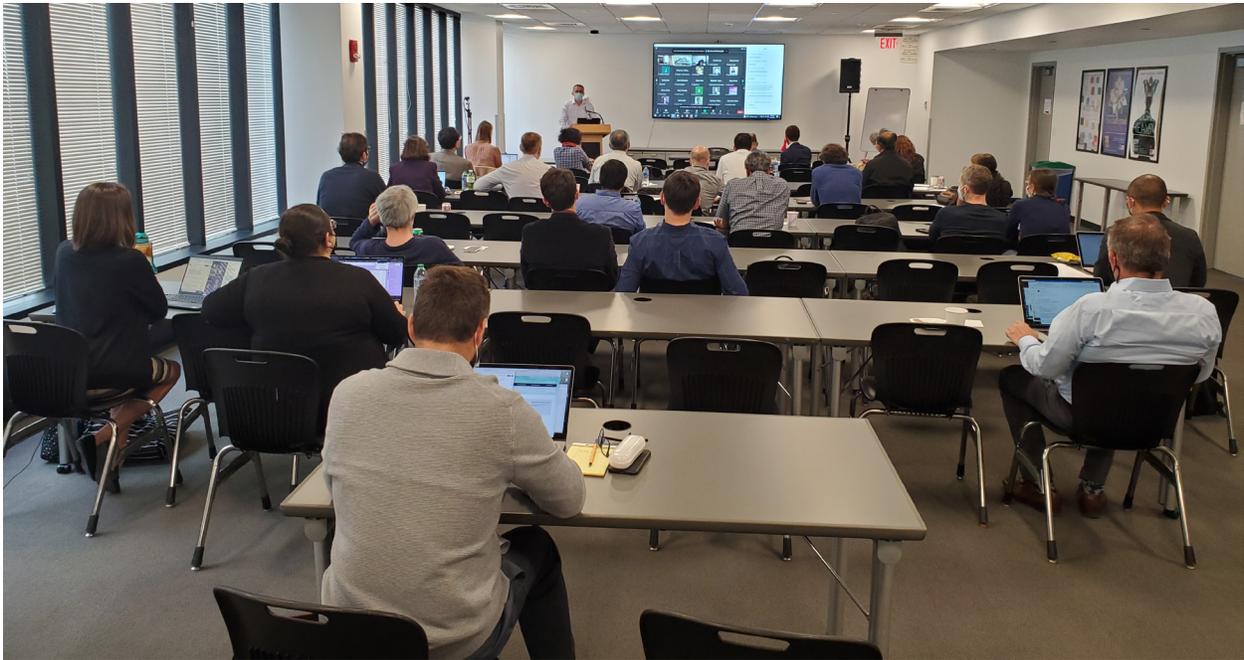
Office of the Vice President for Research
Office of the Provost

TIGER TEAMS

INTERNAL SUMMARY



Stony Brook
Research



INTRODUCTION

In anticipation of significant increases in funding for federal agencies, including NIH, NSF, DOE, and DOD, Stony Brook University established a number of “Tiger Teams” to help prepare faculty in advance of new funding opportunity announcements. The initial ten Tiger Teams focused on areas identified in the USICA bill, which would create a new directorate in the National Science Foundation. These Tiger Teams, each consisting of approximately four to six faculty, mapped our existing strengths to expected topics for new funding. Although much of the teams’ focus was on asset mapping and center-scale funding opportunities, the insights gained will benefit individual investigators and can also provide a roadmap for future investments in strategic areas.

In total, ten teams were formed, led by 1-2 [co] leads and a total membership of 57 faculty. The effort was led by the Office of the Vice President for Research and the Office of the Provost. This internal report provides high level summaries of the strengths, weakness and opportunities that were identified by the Tiger Teams. A more detailed summary is provided in the final reports developed by the individual Tiger Teams.

TIGER TEAM NAMES & MEMBERSHIP

TIGER TEAM

MEMBERS (* denotes lead)

Artificial Intelligence, Machine Learning, Autonomy, and Related Advances

Steven Skiena, Computer Science*
Tahsin Kurc, Biomedical Informatics
Susan Brennan, Psychology
Heather Lynch, Ecology & Evolution
Dimitris Samaras, Computer Science
OPD Rep: Julianna Carbone

High-Performance Computing, Semiconductors, Advanced Computer Hardware/Software

Yuefan Deng, Applied Mathematics & Statistics*
Milutin Stanacevic, Electrical & Computer Engineering
Emre Salman, Electrical & Computer Engineering
Michael Ferdman, Computer Science
OPD Rep: Mandy Frantz

Quantum Information Science & Technology

Tzu-Chieh Wei, CN Yang Institute Theoretical Physics*
Leon Shterengas, Electrical & Computer Engineering*
Dmitri Kharzeev, Physics & Astronomy
Eden Figueroa, Physics & Astronomy
Himanshu Gupta, Computer Science
CR Ramakrishnan, Computer Science
OPD Rep: Donna Scala

Robotics, Automation, and Advanced Manufacturing

Jeff Ge, Mechanical Engineering*
Alex Orlov, Materials Science*
Nilanjan Chakraborty, Mechanical Engineering
Anurag Purwar, Mechanical Engineering
Shanshan Yao, Mechanical Engineering
Barney Grubbs, Chemistry
Miriam Rafailovich, Materials Science
Imin Kao, Mechanical Engineering
OPD Rep: Karrie Gash

Climate Change and Natural and Anthropogenic Disaster Prevention/Mitigation

Liliana Davalos, Ecology & Evolution*
Sara Hamideh, SOMAS
Matt Eisaman, Electrical & Computer Engineering
Ali Farhadzadeh, Civil Engineering
Edmund (Kar) Chang, SOMAS
OPD Rep: Sheri Clark

**Advanced Communications
Technology and Immersive
Technology**

Petar Djuric, Electrical & Computer Engineering*
Meg Schedel, Music
Samir Das, Computer Science
Aruna Balasubramanian, Computer Science
OPD Rep: Karrie Gash

**Biotechnology, Medical
Technology, Genomics,
and Synthetic Biology**

Yi-Xian Qin, Biomedical Engineering*
Clint Rubin, Biomedical Engineering
Maya Shelly, Neurology & Behavior
Richard Lin, Physiology and Biophysics
Eszter Boros, Chemistry
Sandeep Mallipattu, Medicine
OPD Rep: Sheri Clark

**Advanced Energy, Industrial
Efficiency Technologies
Including Batteries, and
Advanced Nuclear Technologies**

Amy Marschilok, Chemistry*
Jason Trelewicz, Material Science*
Stanislaus Wong, Chemistry
Karena Chapman, Chemistry
Fang Luo, Electrical & Computer Engineering
Peng Zhang, Electrical & Computer Engineering
Dimitris Assanis, Mechanical Engineering
Gang He, Technology & Society
Ali Khosronejad, Civil Engineering
Kamazima Lwiza, SOMAS
OPD Rep: Donna Scala

**Data Storage, Data Management,
Distributed Ledger Technologies,
and Cybersecurity, Biometrics**

Erez Zadok, Computer Science*
Fusheng Wang, Biomedical Informatics
Nick Nikiforakis, Computer Science
Michalis Polychronakis, Computer Science
OPD Rep: Julianna Carbone

**Advanced Materials Science,
Including Composites and
2D Materials**

Dilip Gersappe, Materials Science*
John Parise, Geosciences
Surita Bhatia, Chemistry
Anatoly Frenkel, Materials Science
Matt Dawber, Physics & Astronomy
OPD Rep: Mandy Frantz

TIMELINE

In total, the effort spanned five months. Below is a summary of notable timepoints.

July 21, 2021	Members Identified; Teams Formed
July 29-30, 2021	Charge Meetings via Zoom
October 1, 2021	Midpoint Meeting, Wang Center, Room 201
November 15, 2021	Final Reports Due
December 7, 2021	Breakfast with Tiger Team Leads, Connections
December 21, 2021	Final Report Presentations and Open Discussion via Zoom



OUTCOMES

Artificial Intelligence, Machine Learning, Autonomy, and Related Advances

STRENGTHS

SBU has considerable strengths in Artificial Intelligence, which include The Institute for AI-Driven Discovery and Innovation, and is on the threshold of being competitive for large funded projects. There are 19 faculty working in core technological areas of AI (including machine learning, computer vision, natural language processing, and neuroscience) and 29 faculty working in disciplinary applications areas of AI (including faculty from the Biomedical Engineering, Biomedical Informatics, Ecology and Evolution, Linguistics, Psychology, Physics, Radiology, Sociology, and Technology and Society departments).

Specifically noted as a strength is the “core AI Institute faculty” interest in core AI technologies and human behavioral analysis, as well as the “affiliate AI Institute faculty” interest in biomedical applications of AI and human behavioral analysis.

WEAKNESSES

For each of the target areas, the team identified that the single most critical gap is the need for strategic hiring. Specific areas of need are listed below:

- **Climate or Environmental Science:** Technical lead capable of articulating a vision around AI/ machine learning in collaboration with SoMAS and Ecology & Evolution. IACS is a natural home for someone in this area.
- **Biomedical Research:** Senior faculty in clinical informatics with focus on applications of AI in precision medicine and public health.
- **Core AI Technologies:** Junior faculty in CS working in AI for modeling physical systems and time series analysis. To increase breadth, include robotics and research at the interface of AI and security/privacy.
- **Smart Cities/Grids:** A senior faculty/visionary to lead an emerging group of junior faculty here based primarily in Civil Engineering.
- **Human Behavioral Analysis:** Additional technical faculty working in human-AI interaction and ethical AI: how can machine learning systems best serve both society and individuals.

The team also noted a need for institutional support in a few key areas.

- Research-only faculty and staff through a coordinated expansion of SB’s soft-money ecosystem.
- Hiring Faculty who have the time or incentive to lead such efforts, as productive faculty in core AI and potentially fundable applications of AI are over-extended.
- Hiring a mix of core technology faculty in AI/ML, as well as disciplinary faculty (in areas noted) with an interest in applying AI to their research.

Artificial Intelligence, Machine Learning, Autonomy, and Related Advances (continued)

OPPORTUNITIES

Target areas for potential funding have been identified as climate and environmental science, precision public health and time series, smart cities and smart grids, and human behavioral analysis including research on human-AI interaction and the impact of AI on people. Specific opportunities are listed below:

- NSF: National Artificial Intelligence (AI) Research Institutes Accelerating Research
- NIH: Bridge2AI
- DOE: Artificial Intelligence and Technology Office (AITO) Program Plan
- DARPA: “AI Next” campaign.
- NOAA: AI is specifically noted as one of NOAA’s Science & Technology focal areas and a recent Strategic Plan



High-Performance Computing, Semiconductors, Advanced Computer Hardware/Software

STRENGTHS

SBU has substantial strengths in three areas of high-performance computing including applications development, hardware (from devices to circuits to architectures), and software.

The strengths in applications stem from the following research areas: protein structures and drug design, biomedical engineering and healthcare, computational chemistry and physics, machine learning, and solution of differential equations.

Strengths related to semiconductors include semiconductor device research in the Department of Electrical and Computer Engineering with application to optoelectronics.

WEAKNESSES

In the area of semiconductors and advanced hardware, research activities related to devices are highly limited at SBU. Research activities related to circuits and architecture for computing are primarily at the scale for small or medium NSF grants.

SBU lacks experimental fabrication and prototyping facilities related to integrated circuits and emerging semiconductor technologies.

The number of SBU researchers working on HPC infrastructure research (e.g., systems, algorithms, compilers) is limited.

Overall, there is not enough faculty in HPC or post-award administrative support to manage increased larger awards.

OPPORTUNITIES

To strengthen research related to HPC applications, algorithms, hardware, and software, the team recommends hiring three national leaders, recruiting 20 graduate students, and initiating strategic partnerships. They also suggest leveraging existing research including photonic integrated circuits, and targeting funding to purchase centralized GPU cluster resources.

To make up for SBU's lack of fabrication facilities, SBU should enhance partnerships with SUNY Poly, SUNY Binghamton, BNL, AFRL, and IBM.

The team identified over twenty funding opportunities that are listed in their final report.

Quantum Information Science & Technology

STRENGTHS

SBU has several successful PIs working in QIST. SBU possesses significant individual excellence in the following target areas: quantum advantage & applications, quantum systems engineering, quantum simulations, quantum information theory, quantum workforce development.

A few topics where multi-PI efforts can be constructed and expanded on the basis of our strengths are:

- Developing the technology to build long distance entanglement distribution networks.
- Developing distributed quantum computing platforms, exploring how to interconnect many quantum processors via the quantum internet and how this will provide an exponential advantage in computing speed-up with respect to using isolated devices.
- Developing new scientific applications of large quantum networks, exploring a whole new range of scientific applications for entanglement based quantum networks using quantum advantage in resolution, sensitivity, and precision.

WEAKNESSES

The team noted a lack of critical mass, integration and coordination, and inter-department collaboration in the following target areas: quantum advantage and applications, error correction and mitigation, quantum systems engineering, quantum materials, quantum simulations, quantum information theory.

Although there are collaborations with QIST industry, there is a lack of developed large-scale programs with industry partners. Successes are at small-to-medium-scale proposal level. A lack of centralized experimental facilities also hinders application specific QIST projects.

OPPORTUNITIES

There are existing NSF funding opportunities listed in the final report including QLCI, QAMASE & FRHTP. In addition, Future applications for MRSEC and NSF MRC centers could contain QIST research related to materials (this will require coordination with the other Tiger Team on Materials Science). Other likely federal sponsors in quantum information science and technology include: DOE, DOD ARPA, NASA. (Specific funding opportunities are listed in the final report).

The team agrees that it is of paramount relevance to form a locally-funded QIST center in SBU in the near future, in order to maintain relevance in the national QIST landscape. A concerted effort at establishing a longer-term center will pull faculty from different units in the university into teams, which then can readily address emerging FOAs. The team discussed that a center should be built on the already available SBU QIST strengths, including the strong theoretical component on QIST protocols and applications, and the large experimental effort on quantum networks, including the Long Island Quantum Information Distribution Network (LIQuIDNet) testbed.

Robotics, Automation, and Advanced Manufacturing

STRENGTHS

SBU has significant strength in advanced robotics and embodied intelligence, medical and rehabilitation robotics, service robotics, infrastructure for artificial intelligence, cybermanufacturing, smart and digital manufacturing, and additive manufacturing.

WEAKNESSES

The team found gaps in the future priority funding areas described by the Office of Science and Technology Policy: (1) strengthening opportunities for food and agricultural manufacturing (improved cost and functionality of bio-based products), (2) enhancing resource efficiency in manufacturing and decarbonization of manufacturing industry (green manufacturing, energy efficiency, carbon footprint, low-carbon construction materials), and (3) adaptable and flexible supply networks. While some of these emerging areas can potentially strengthen SBU, the university may not always have a critical mass to lead proposals in the food or agricultural areas.

Moreover, for manufacturing technologies, the team feels that SBU does not have faculty focused solely on manufacturing, either in Manufacturing Automation or in Materials Processing. Strengthening these areas through faculty hiring can be a viable path forward. Furthermore, while there are many SPIR related projects, we do not have large scale industrial partnerships and industrial research projects. Although we have strong connections to Brookhaven National Laboratory (BNL), BNL is primarily focused on basic science, whereas other labs (NREL, SNL and others) capture much more of the ARPA-E and EERE (AMO) funding. Establishing connections to other national labs is a great way to capture manufacturing related funding in the future. In the area of robotics/automation technologies, there is a critical lack of personnel in systems integration and control background in robotics that would enable us to show system level capability. This would allow us to go after large grants, for which system integration is a key part.

OPPORTUNITIES

The team analyzed current funding proposals, budget requests, and priority funding areas identified by the Office of Science and Technology Policy (OSTP). The available data from 2017 indicates the total budget for manufacturing activities came mostly from the DOE (\$212M) and DoD (\$188M), as well as NSF (\$98M).

For Robotics, support in 2020 mostly came from NSF, including DOT, NASA, NIOSH, USDA/NIFA (\$32M), DoD (\$8.3B), the Navy (over \$2.5B for unmanned systems RDT&E), followed by the Army, Air Force, and other agencies, and NASA (\$1.6B, with a plan to allocate a budget of \$35B from 2020 to 2024 for the Artemis lunar program).

Federal agencies frequently put out calls for public comment.

Climate Change and Natural and Anthropogenic Disaster Prevention/Mitigation

STRENGTHS

The team identified strengths in the following topic areas:

- Mitigating the effects of floods, storm surge, and sea level rise
- Ocean acidification mitigation
- Carbon dioxide capture and/or removal
- Early warning systems
- Community resilience including infrastructure and other systems
- Mitigating ecosystem effects
- Prediction
- Societal effects

WEAKNESSES

The considerable costs of setting up and maintaining collaborations, often borne by individual researchers, is considered one of SBU's weaknesses. The barriers that prohibit finding expertise throughout campus, as well as the asset gaps in the areas of risk assessment and planning, community & government relations, medicine & public health, and ocean acidification mitigation and mitigating ecosystem effects were also identified as weaknesses.

Gaps were identified in the following areas:

- Planning and design
- Environmental economics
- Ecosystem ecology
- System engineering or systems approach
- Practitioners who are specialists in engagement in environmental community
- Bridge to municipalities and government agencies
- Social scientists focusing on local issues (Many SBU social scientists work on global issues instead)
- More collaborations with the Medical School for climate and human health issues
- Support for cross-discipline teams with seed grants
- Structured debriefing/lessons learned from cross-discipline applications that do not get funded on the first try in order to learn from the experience instead of losing the experience

Also noted as a weakness is the high rate of PI turnover in key departments and the variation in incentive structure across colleges and departments. This is a significant hindrance to developing new collaborations. There is also insufficient institutional commitment to build communities and evaluate past failed efforts. There are no internal programs on campus to train people to think in interdisciplinary terms and there is a lack of diversity in expertise at Stony Brook. This leads to certain people being overburdened. Finding expertise across campus is difficult and requires considerable investment.

Climate Change and Natural and Anthropogenic Disaster Prevention/Mitigation (continued)

OPPORTUNITIES

The Directorate for Technology, Innovation, and Partnerships: TIP will further cultivate new innovation ecosystems at the scale of individual communities and regions throughout the U.S., advancing use-inspired, solution-oriented research and innovation in a range of technology areas as well as in a diverse set of national-challenge areas of priority to the Administration and Congress.

The Directorate of Biological Sciences and Science and Technology Centers: Integrative Partnerships are also opportunities that align well with the team.

The NSF's Convergence Accelerator workshops and priorities projects are listed below:

- Modeling (frameworks that have end-to-end institutionalized cyberinfrastructure to be used by division makers and accounts for equity and justice of serve communities),
- Education (Develop formal education programs focused on the needs of multidisciplinary collaborations for improving Societal Shock Resilience)
- Engagement (increase public education and community engagement; engage stakeholders and support policy change).

The FY22 budget outlook also suggests that NOAA will be provided funds to expand their Regional Integrated Science and Assessments (RISA), and the Senate has recommended that NOAA also consider establishing a cooperative institute focused on coastal resilience and adaptation. Other funding opportunities are listed below:

- EPA: e.g. Particulate Matter and Related Pollutants in a Changing World
- DOE: \$10m for Earth and Environmental Systems Modeling Carbon Negative Earthshot
- NASA: a list of relevant funded projects
- Office of Naval Research: includes an Ocean Battlespace and Expeditionary Access, itself comprising coastal geoscience, oceanographic, and meteorological calls for funding.
- The Alfred P. Sloan Foundation funded a project for a modeling framework to advance a systems-level understanding of the impacts of climate change on power systems.
- The Wyss Campaign for Nature aims to create protected areas on land and sea to protect biodiversity and avert the worst outcomes of climate change.

Advanced Communications Technology and Immersive Technology

STRENGTHS

The identified strengths in the area of Advanced Communications are in wireless, quantum communications, mobile sensing, edge networks, power systems, and network applications. In the area of Immersive Technology, our strengths are in visualization and graphics.

WEAKNESSES

In Advanced Communications, we have critical gaps in the areas of core networking and RF, mixed signal circuits, and antenna design. In Immersive Technology, we have a gap in interdisciplinary faculty that work on extending immersive technology research to applications.

OPPORTUNITIES

Almost all federal agencies invest in the areas of communications and immersive technology on a regular basis. This includes NSF, various arms of DoD (including ARO, AFOSR, ONR, DARPA), NIST, DHS, and NIH to a smaller extent. Arguably, communications is a cornerstone of much of the defense research. Although NSF and other federal agencies routinely hold workshops for collecting community input and sketching out roadmaps on various topics, there does not seem to be any real history of strong correlation between such reports and subsequent RFPs. Many likely target areas or research topics for RFPs from relevant sponsors are listed within the final report.

It is important that we maintain a state of readiness for funding opportunities. It is a good idea to do ideation and/or team formation activity long before major anticipated deadlines (e.g. NSF ERC). Again, providing support or incentives such as small-targeted seed funding to address specific RFPs will be very helpful.

Biotechnology, Medical Technology, Genomics & Synthetic Biology

STRENGTHS

SBU has very strong research disciplinary expertise in almost every cutting-edge research relevant to this Tiger Team. In some dedicated areas, SBU has advanced researchers, technology, and facilities, such as bioimaging. SBU faculty have experience in initiating and generating program and center grants through established leaders, investigators, and review panel members for federal funding agencies.

WEAKNESSES

There is a need for sufficient incentivizing mechanisms to motivate faculty to pursue large external grants. There is a need for support with preparation, conducting, and continuing program/center grants including support at the following levels:

- Pre-proposal: seed grants, seed grants for center grants, team forming.
- Proposal preparation: grant writing, support team, submission strategy, and faculty support.
- Post-funded grants: core facility, new idea stimulation, space, new faculty lines, student support, sustainability. This may include the guarantee of matching funds if grants are awarded.

Some suggested approaches are:

- Bottom-up approach: The research ideas and research team forming will be initiated by SBU faculty, as they are familiar with the advanced research in related areas and can lead the cutting-edge research
- Top-down approach: University shall help to facilitate the team forming, to set up the priority areas, and to guide the proposal generation
- Strategic Research Committee: As the development of large program and center grants is a long process, forming a university level committee may help the strategic planning

OPPORTUNITIES

- Major federal sponsors to support research in this area include the National Institute of Health (NIH), National Science Foundation (NSF), Department of Defense (DOD), Department of Energy (DOE), NASA, and the Center for Disease Control (CDC), DARPA.
- Applied science SBIR/STTR opportunities.
- Additional federal sponsors include NASA and the Airforce Office of Scientific Research (AFOSR). Other agencies, state or otherwise, include NY-STEM, the Alzheimer's Foundation of America, ALS Association, and the American Heart Association.
- New York State (health sciences and health security issues)

List of likely target areas or research topics for RFPs:

- Functional Diagnostic Bioimaging: in cognition, concussion, depression (including brain imaging, depression, mood disorders, cognitive impairment, Alzheimer's Disease)
- Synthetic Biology: in computational biology, gene editing (including genetic engineering, computational biology, biomarkers, single-cell and genomics)

Biotechnology, Medical Technology, Genomics, & Synthetic Biology (continued)

- Neuroengineering and Brain: in brain aging and related AD and PD (such as drug discovery, live-cell imaging, neuroprotection, animal modeling of neurological disease, cerebrovascular disorders, cardiac arrest, reperfusion injury)
- Biomaterials and Regeneration (tissue adaptation, regeneration, and nanomaterials; cellular and molecular pathways, stem cell, gene editing, imaging and treatment; computational modeling)
- Pathogenesis, immunoengineering, infection (immunoengineering, infectious disease model, COVID diagnosis and treatment, disease models)
- Machine learning, AI, big data CORE (data mining, AI disease prediction, digital pathology, digital imaging analyses, machine learning, nonlinear modeling)
- High-resolution imaging CORE (single-cell imaging, functional imaging, nanotechnology, biomarkers)



Advanced Energy, Industrial Efficiency Technologies Including Batteries, and Advanced Nuclear Technologies

STRENGTHS

The theme of this Tiger Team aligns with significant growth areas of funding from multiple funding agencies, particularly the Department of Energy (DOE) and National Science Foundation. American Institute of Physics summaries of FY22 Discretionary Budget Proposals and those specific to the DOE Applied Energy R&D are provided in their final report. Several members of the Tiger Team are funded in these areas, including two DOE Energy Frontier Research centers.

WEAKNESSES

In order to promote and support large scale center research at SBU, the university administration must reward collaborative activity in faculty review / promotion processes, including but not limited to support for collaborative funding, co-authored publications, and joint supervision and mentoring of graduate students and postdoctoral researchers.

Many projects in the AEIET area require significant experimental facilities. Continuous facilities access to execute projects is especially important for new faculty hires and junior faculty with critical timing targets for tenure and promotion. New faculty hires should be made only when appropriate facilities are available for their research efforts. Major campus renovations, such as renovation of the Chemistry Building, should be planned and executed with minimal disruption to critical research efforts, especially for early career faculty. SBU should prioritize development of unique facility and instrumentation (i.e. NSF-MRI) that can be leveraged in large center grants.

Regarding the Fusion Energy Research topic discussed as an opportunity below, expertise is presently concentrated to a small group in MSCE. Several faculty have been identified across other departments with an interest in this research area but not necessarily with funding. The team suggests the development of a strategic plan and timeline for future faculty hires and facilities modernization to capitalize on funding in fusion energy and advanced nuclear technologies.

OPPORTUNITIES

The AEIET Tiger Team has made progress on identifying future high-impact opportunities in advanced energy and industrial efficiency technologies based on the analysis of federal funding landscapes and recommendations from national reports. However, in our efforts to align faculty expertise, facilities, and other unique strengths at SBU with these opportunities, we have identified significant gaps in pooled information (e.g., MyResearch, PIVOT, etc.) that require polling of departments as well as input from specific faculty for building a useful information database.

Advanced Energy, Industrial Efficiency Technologies Including Batteries, and Advanced Nuclear Technologies (continued)

This team's report identified fusion energy research as an area of opportunity. The Engineered Microstructures and Radiation Effects Laboratory in the Department of Materials Science and Chemical Engineering (MSCE) is at the forefront of the growing research enterprise focused in these areas at SBU. Given the large pivot in the national fusion program to materials and technology, expertise and facilities targeting a diverse range of topics beyond the singular focus in MSCE would position SBU to capitalize on a rapidly growing source of federal funding with an emphasis on large, interdisciplinary teams in the following areas: materials for extreme environments, radiation materials science, accelerator physics (supporting the goal of FPNS), advanced materials characterization, modeling with an emphasis on bridging lower length scale physics with component design, molten salt chemistry and compatibility, and compact heat and energy systems.



Data Storage, Data Management, Distributed Ledger Technologies, and Cybersecurity, Biometrics

STRENGTHS

The team identified 30 SBU faculty in Data Storage and Management and 14 SBU faculty in CyberSecurity as strengths. The team also identified 13 external faculty collaborators in the field of Data Storage and Management and 17 external faculty collaborators in CyberSecurity as additional strengths.

WEAKNESSES

In this area of growing importance, the team feels that SBU lacks expertise in distributed ledger technologies, especially in CEAS, with only ten faculty identified internally (and only 5 external). The team has also identified only twelve SBU faculty in biometrics, many are exclusive in the subfield of facial recognition (and no external faculty identified). Therefore, the biggest gap is in biometrics with no known expertise in subfields of voice recognition, human real-time analysis, and others. The team also identified a gap in distributed ledger technologies.

OPPORTUNITIES

The team would like to see medium-to-large size teams forming a “critical mass” that would be nationally recognized, rather than individual faculty hires in emerging or gap areas.

Funding opportunities relevant to this team are listed below:

- NSF: Core Programs
- NSF: Secure and Trustworthy Cyberspace (SaTC)
- NSF: AI Research Institutes
- DOD: generally include updates from DARPA, ONR, and AFRL
- NIH: Human BioMolecular Atlas Program

Advanced Materials Science, Including Composites and 2D Materials

STRENGTHS

SBU has strengths in materials characterization, theory, and modeling as well as quantum materials (quantum computing and quantum networking), but there are notable gaps within these strength areas.

WEAKNESSES

SBU has very limited expertise in synthesis of new materials as well as electron microscopy. Though SBU has strengths in quantum computing and quantum networking, there is a limited materials effort in those areas. Other weaknesses include lack of a centralized facility and inadequate administrative support.

OPPORTUNITIES

For DOE funding opportunities, faculty should attend workshops highlighting the Basic Research Needs in specific topic areas and then share the workshop report and recommendations to the SBU researchers in that particular area. Examples of reports from past DOE workshops can be found [here](#). Most of the active funding in this area at SBU is from NSF or DOE, so it may be a good idea to target DOD funding in the future. Materials is a very broad research area, but NSF and DOE seem to be focusing on the following subtopics: Carbon Neutral Hydrogen Technologies, Advanced Manufacturing, Materials Under Extreme Environments, and BioTechnology and Synthetic Biology.

Aside from funding opportunities, the team strongly felt that creating a central materials characterization facility (CMCF) would give SBU a key competitive advantage to successful frontline materials programs.

They also suggest hiring faculty and trained technical staff in gap areas, providing institutional matching funds, setting up ad-hoc review panels for limited submission programs, holding periodic workshops on selected areas of materials research as well as workshops with funding agencies, setting up a graduate survey course co-taught by experts on Materials Characterization methods, and continuing the Tiger Teams effort in the form of a committee with a rotating chair and membership.

Contact Us

This initiative has been managed jointly by the Office of the Vice President for Research and the Office of the Provost.

OFFICE OF THE VICE PRESIDENT FOR RESEARCH

Richard J. Reeder, PhD
Vice President for Research
richard.j.reeder@stonybrook.edu
(631) 632-7932

Nina Maung-Gaona, PhD
Associate Vice President for Research
nina.maung@stonybrook.edu
(631) 632-7932

OFFICE OF THE PROVOST

Alfredo Fontanini, MD, PhD
Vice Provost for Research
and Infrastructure
alfredo.fontanini@stonybrook.edu
(631) 632-4100



Prepared by the Office of Proposal Development



Stony Brook
Research