

The Science Center Strategic Plan 2017-2020

INTRODUCTION

Welcome to the Strategic Plan for The Science Center at Brown University. This plan is a blueprint for the overall direction and growth of the Center over the next three years. Gelonia Dent, PhD, Director of the Science Center, David Targan, PhD, Associate Dean of the College for Science Education and Oludurotimi Adetunji, PhD, Associate Dean of the College for Undergraduate Research and Inclusive Science, collaboratively developed all of the ideas put forth in this document. The Dean of the College and members of the Science Center Advisory Board¹, who represent all branches of the science disciplines at Brown and the alumni community, also contributed valuable feedback in the development of this plan.

HISTORY

The Science Center would not exist if not for the exemplary vision and leadership of Dr. David Targan. In 1990, Dr. Targan, while teaching introductory physics courses, envisioned other ways to engage his students outside of the classroom. To this end, over the past 30 years at Brown, he has broadly promoted science through his work, which has led to the development of nationally recognized programs in support of female students and those from historically underrepresented groups² in the sciences. Dr. Targan has also used his background as a physicist and science educator to form collaboration with faculty colleagues that has led to over \$25 million of external funding to Brown, and development of new teaching innovation in science pedagogy. In 2010, Dr. Targan's vision of Brown having a *hub* for science-- a central space on campus that links scientific research, teaching and service became a reality through the creation of The Science Center for which he served as the inaugural director.

MISSION

The Science Center mission is to foster interdisciplinary science collaboration among Brown faculty and students, to advance students' curiosities about science, and to promote the societal benefits of scientific research, broadly.

¹Maud S. Mandel PhD, Dean of the College and Professor of History and Judaic Studies; Science Center Advisory Board Members: Galen Henderson, MD President Brown Alumni Association, Ravi Pendse, PhD, Vice President for Computing and Information Technology/Chief Information Officer; Jill Pipher PhD, Vice President for Research, Elisha Benjamin Andrews Professor of Mathematics and Jason Sello, PhD, Associate Professor of Chemistry

² [Pathways to Diversity and Inclusion: An Action Plan for Brown University](#), defines historically underrepresented group (HUG), as a group, which includes students who report themselves as Hispanic or Latino, American Indian or Alaskan Native, Black or African American, or Native Hawaiian or Other Pacific Islander. For faculty, HUG also includes those who report themselves as "2 or more," provided at least one of the reported categories is in the list. In 2004, Asian or Pacific Islander was a single reporting category, Asian.

The next sections provide an outline of the goals, an evaluation strategy, and the organizational structure of the Center.

GOALS

We will expand the Science Center's reach and impact on and beyond the campus in five areas, some currently underway, which will expand the Center's reach and impact on and beyond the campus.

The core work of the Science Center is to facilitate knowledge transfer between novices and experts. The process through which knowledge transfer occurs is called knowledge exchange, that is, a dynamic process that incorporates distinct forms of knowledge from multiple sources (Ward et al. 2012). Recognition of diversity in the thinking styles of novices and experts in multimedia learning (Adetunji et al 2015) is a key component in knowledge transfer. We will incorporate these ideas to construct a scientific knowledge exchange framework that fully encompasses our core work guided by the following goals.

- Goal 1.** Establish a scientific knowledge exchange framework
- Goal 2.** Retain undergraduates in the broad range of science concentrations
- Goal 3.** Promote and advance societal benefit of scientific research and scholarship
- Goal 4.** Build visibility and collaboration across campus and beyond
- Goal 5.** Support the institutional commitment to create an equitable, diverse, and inclusive community, particularly among scientists.

OBJECTIVES AND ACTIONS

Goal 1. Establish a scientific knowledge exchange framework

Objective 1. Design and build a scientific knowledge exchange framework

Actions

- ❖ Research existing knowledge exchange frameworks from different domains
- ❖ Access and analyze our existing programs to identify essential elements for knowledge exchange
- ❖ Build a scientific knowledge exchange theoretical framework inherent to the activities of the Science Center

Outcomes

The Science Center, as a hub for science, will become synonymous with scientific knowledge exchange

Objective 2. Develop and implement programming to explore relevant interdisciplinary topics through the scientific knowledge exchange framework

Actions

- ❖ Identify relevant and/or timely knowledge domains that are of interest to our science community
- ❖ Identify researchers and practitioners with expertise in these topics and fields.

- ❖ Identify appropriate and effective media to facilitate scientific knowledge exchange

Outcomes

Programs such as science communication, science policy, workshops for faculty and postdocs on broader impacts and partnerships with groups such as STEAM are designed and assessed according to the principles of the scientific knowledge exchange framework. Formative and summative assessment methods are used for feedback, to fine-tune programming while creating a more robust framework.

Goal 2. Retain undergraduate students in science concentrations

Objective 1. Provide academic support and pre-professional advising/mentoring to students in science concentrations, particularly HUGs in the physical sciences

Actions

- ❖ Create unique and innovative programmatic opportunities to fortify students' experiences in science
- ❖ Sustain programs, such as Brown Science Prep, New Scientist Collective (NSC), SACNAS@Brown, Women in Science and Engineering (WiSE), and Sigma Xi, which support students in the science disciplines.
- ❖ Conduct surveys to collect data about students' experiences in the concentrations and feedback on programmatic activities.

Outcomes

- Increase our understanding of the factors that inhibit students' interest and persistence in studying science.
- Disseminate our best practices on retention of undergraduate students in science concentrations at conferences and in publications in peer reviewed journals

Objective 2. Attract more science faculty to mentor and train students concentrating in the sciences

Actions

- ❖ Facilitate the partnering of faculty with HUG students for research training and mentoring
- ❖ Assist in efforts to institutionalize strategies to improve student performance in introductory STEM courses and auxiliary, evidence-based, high-impact activities developed by HHMI- and AAU-funded departments.
- ❖ Develop on-ramps into the research enterprise for first and second year students in the sciences who have never before engaged in scientific research

Outcomes

- Raised awareness of informal and formal communication between science faculty and students
- Sustained connections with guest speakers and opportunities for them to mentor and sponsor interested students

Goal 3. Promote and advance societal benefit of scientific research and scholarship

Objective 1. Faculty and students are mutually engaged in endeavors that link ongoing research to meaningful societal impacts

Actions

- ❖ Develop activities that focus on societal benefits of research for campus and local communities
- ❖ Establish infrastructure for creative science communication and science policy
- ❖ Promote new and existing connections with faculty and students involved in innovation and entrepreneurship

Outcomes

- Faculty and students have the essential tools needed for meaningful public engagement with science
- Faculty and students understand how to engage and communicate societally relevant outcomes of their scholarly research to specific stakeholders
- Science Center provides opportunities for interaction between students and faculty in Science and Society, Development Studies, Economics, Engineering, Computer Science, Sociology, etc., and provides seed support and guidance for entrepreneurship ventures.

Goal 4. Build visibility and collaboration across campus and beyond

Objective 1. Disseminate information about the Center's programmatic activities

Actions

- ❖ Collect and analyze data to understand usefulness of all programmatic endeavors
- ❖ Document programmatic activities; archive and share events through social media platforms

Outcomes

- Generate and distribute regular reports on the Center's programs
- The Science Center becomes a viable resource for both faculty and students
- Establish a regional and national reputation for supporting and promoting eminence in science

Objective 2. Build sustainable collaborations with other campus, peer institutions and local organizations

Actions

- ❖ Build partnerships with other units and departments on science-relevant programming
- ❖ Build partnerships with other peer institutions around mutual science related interests
- ❖ Expand partnerships with local institutions (such as the RI STEAM Center) by strengthening ties and creating more opportunities for our students and faculty

Outcomes

- Establish new campus partnerships
- Expanded programs through co-sponsorship of events with local and peer institutions

Goal 5. Endorse the institutional commitment to equity, diversity, and inclusion

Objective 1. Advocate for diversity, inclusion and equity in the sciences

Actions

- ❖ Highlight the efforts of those science departments on campus that are engaged in transformative activities that broaden participation of faculty and students in STEM fields
- ❖ Expose the science community at Brown to a broader set of scientists from diverse backgrounds and careers to share their work and various perspectives on being in science

Outcomes

- Helped foster an inclusive and diverse scientific community as described in “[Building on Distinction](#)” and “[Pathways to Diversity and Inclusion: An Action Plan for Brown University](#)”
- Increased participation of science faculty in training and mentoring of HUG undergraduate researchers

Evaluation Strategy

The Science Center will adopt a summative evaluation approach for this strategic plan. The following steps will be applied to each goal:

1. Identify all stakeholders and participants who are directly involved in the activity or program
2. Determine key questions that must be addressed in order to generate the desired outcome(s)
3. Determine whether the outcomes are short-term or long-term
4. Determine the appropriate data and assessment measure for all programs
5. Perform the appropriate data analysis
6. Disseminate results to appropriate audiences

Organizational Structure

The Science Center is part of the office of the Dean of College. The operational staff is comprised of a director, an administrative coordinator, a program coordinator and a minimum of 15 student staff members. In addition, two academic science deans serve in advisory roles to the Center. The deans promote a positive image of the Center both nationally and internationally. They also lead major initiatives and committees as part of their contributions to the mission of the Center.

Table 1. Science Center Administrative Staff

Name/Title/Position	Contact	Location
Gelonia Dent, PhD Director	Gelonia_Dent@brown.edu (401)-863-1629	Science Center Room 328
David Targan, PhD Associate Dean of the College for Science Education	David_Targan@brown.edu (401) 863-2314	University Hall Room 314
Oludurotimi Adetunji, PhD Associate Dean of the College for Undergraduate Research and	Oludurotimi_Adetunji@brown.edu (401) 863-2411	University Hall Room 213

Inclusive Science; Director, Science Outreach		
Coordinator/Administrative Assistant ³	Jacinta Lomba@brown.edu (until Feb. 2018)	Science Center Room 321
<i>Affiliated Staff</i>		
Geeta Chougule Program Coordinator Bio Med Molecular, Cellular Biology Biochemistry	Geeta_Chougule@brown.edu	Science Center Room 327

Science Center Advisory Board

The Science Center Advisory Board consists of four (4) appointed members from the ranks of faculty, administration or alumni, of Brown. These appointed Board members will serve a two-year term, with a one-year renewal, if so desired. Our expectation is that members will make valuable contributions to the direction of the Center towards its mission during their tenure.

Advisory Board Members appointed July 1, 2016:

Dr. Galen Henderson, President Brown Alumni Association, Director of the Division of Neurocritical Care, Brigham and Women’s Hospital-Boston

Dr. Ravi Pendse, Vice President for Computing and Information Services/Chief Information Officer

Dr. Jill Pipher, Vice President of Research and Elisha Benjamin Andrews Professor of Mathematics

Dr. Jason Sello, Associate Professor of Chemistry

Additionally, the Center’s Director and its affiliated Deans will comprise one vote, and the Director will have final say for that vote. Should a position be vacated prematurely a reasonable replacement will be selected to fill the spot as soon as possible.

References

Vicky Ward, Simon Smith, Allan Hose & Susan Hamer. (2012). “Exploring knowledge exchange: A useful framework for practice and policy”. *Social Science & Medicine* 74(3), 297-304
<https://doi.org/10.1016/j.socscimed.2011.09.021>

Adetunji, O., & Levine, R. (2015). Developing effective STEM animations: Application of a multimedia learning theoretical framework. *Journal of Research in STEM Education*, 1(2), 106-124.
http://j-stem.net/issue_2/

³ This position may be redesigned and called *Program Specialist*, to focus its main duties towards supporting thematic programming. This change may attract recent postgraduates who have relevant experience or interests that may compliment the Center’s work.