Proposal

Lehman College
Center for
Theoretical and Computational Sciences

Content:
1. Mission Statement ...................................................................................................................... 3
2. Goals ........................................................................................................................................... 3
3. Center Functions (activities in support of goals) ...................................................................... 4
4. Personnel and Administrative Structure .................................................................................. 5
5. Membership .................................................................................................................................. 6
6. Required Resources .................................................................................................................. 7
7. Funding Plan ............................................................................................................................. 8
8. Timeline ..................................................................................................................................... 11
1. **Mission statement:**

   The Center for Theoretical and Computational Sciences will serve to facilitate highest-level research and the education of future experts in the field of theoretical natural and computational sciences at Lehman College. The center will expand and disseminate knowledge in the area of theoretical and computational sciences by engaging undergraduate and graduate students in faculty/student collaborative research.

2. **Goals:**

   - The center will develop a pipeline to bring together and mentor high-potential and talented students towards high-impact careers in the theoretical and computational sciences. This pipeline will begin in high school and lead all the way to advanced degrees. The center will provide financial support, including student scholarships, for the education of students accepted to the center. It will develop new educational opportunities for center students and provide individual mentoring for students in the framework of research projects leading to student/faculty collaborative publications and presentations at professional meetings.
   - The center will enhance the reputation of Lehman College as a Center of Excellence in the theoretical and computational sciences. The center will facilitate and support research by center members at all levels, ranging from high school students to senior faculty.
   - The center will encourage interdisciplinary interactions between the many diverse departments on campus involved, directly or indirectly, in the theoretical and computational sciences. These interactions will benefit everyone from students to senior faculty.
   - The center will support outstanding visiting national and international faculty who will contribute to the center’s mission and reputation.
   - The center will provide a venue for CUNY faculty and students to learn about progress in the theoretical and computational sciences through lectures and focused workshops and encourage new collaborations to grow from these events.
   - The center will attract external funding in support of center activities.

**Rationale:**

Lehman College is uniquely situated to advance STEM education in the Bronx and has faculty conducting high-level research in the theoretical and computational sciences. A highly visible externally-funded center will meet the Lehman College strategic goals of supporting excellence in research and scholarship, strengthening and expanding STEM education, achieving greater external recognition and success for our academic programs, and recruiting well-prepared and motivated students. A successful center will also help recruit new high-profile faculty members to Lehman College.
3. **Center Functions (activities in support of goals):**

- The center will provide educational opportunities to students. For example, the center may support the creation of cross-departmental special seminars which would serve as capstone or honors seminars for students majoring in an appropriate discipline. These special seminars are envisioned as one- or two-semester courses taught by center faculty with the active involvement of graduate students and with rigorous prerequisites, on topics that could vary from year to year. They would be open only to selected students, and designed to provide these students with advanced training that will enable them to engage in research. Some of these courses could be taught at the Macaulay building in Manhattan to attract students from other CUNY campuses.

- The center will provide mentored research opportunities to undergraduate students, building on the topics covered in the honors courses to provide a much-needed pipeline from education to research.

- The center will provide a student communal/lab room to foster community, collaborations, and collective learning experiences among members of the center.

- The center will engage with local high schools and the Lehman community to identify and recruit suitable students, with a particular emphasis on first-generation students from underrepresented groups. The center should participate in admission process to the Macaulay Honors College as a potential pool for students and we expect that the center will serve to draw Macaulay students interested in the sciences to Lehman College. Also, the center should partner with the Bronx Institute to attract the best students from the Bronx.

- The center will attract and retain high-quality students by offering prestigious scholarships, to some degree modeled after the Meyerhoff Scholarship Program.

- The center will provide funding and resources to enhance and support research in the theoretical and computational sciences at Lehman College. This may include reassigned time for center faculty, stipends and travel support for undergraduate students, graduate students and postdocs affiliated with the center, and funding for external visitors, both short- and long-term.

- The center will host visitors and will sponsor lectures and symposia. Some of these will serve to educate center faculty and students on topics of current research interest, while others will be targeted at a broad audience and will serve to enhance the public visibility of the center.

- The center will facilitate collaborative research and educational grant proposals submitted by the center’s members. It will also develop new sources of funding, in particular private and corporate donations targeted at student scholarships.
Rationale:

The educational opportunities offered by the center are not intended to compete with any existing program or course at Lehman College. On the contrary, they will provide a new setting for high-level education and training in STEM fields. The educational and research opportunities, scholarships and travel funds made available to students through the center will do much to attract high-quality students and enhance retention and graduation rates.

The establishment of a highly selective and prestigious center will attract students who would otherwise not choose Lehman College. The high visibility of concentrated efforts within the center, as an outstanding beacon of research excellence in the Bronx, will contribute positively to the national and international reputation of our college.

The scholarly potential of high-level research faculty at Lehman College will be augmented by the funding and resources provided by the center. This will lead to positive feedback in attracting external research grants.

The center will attract visitors and postdoctoral students who will contribute to the research agenda as well as the mentoring of undergraduate and graduate students.

Synergy effects and collaborative efforts that will result from the establishment of the center will open up new sources for external funding that are not available to individual researchers. It will attract public and private funding to support students at all levels as well as lectures, symposia, and guest professor programs.

The center will be housed at Lehman College because of its high density of highly recognized and awarded scientists focusing on theoretical and computational sciences.

4. Personnel and Administrative Structure

The center’s personnel will consist of faculty members, student members, an executive committee, and a director. An external advisory board will be established within three years after the official opening of the center.

The center will be led by a Director and an Executive Committee. The Director will provide administrative leadership for the Center, supported by an Executive Committee which shall provide academic and scientific oversight. The Dean of NSS will serve as the inaugural Director of the Center. After the center has been in operation for no more than one year this role will pass to a faculty member. The Director will be a tenured faculty member of Lehman College and will serve a term of three years. The Director of the Center will be appointed by the President of Lehman College upon recommendation from the Executive Committee. The Executive Committee will consist of five people: The Director and four center members. No more than two of the latter shall
be chosen from one department. Members of the Executive Committee must be full-time, tenured or tenure-track faculty at Lehman College who meet the criteria for membership in the Center. A student will be selected to serve as a non-voting representative to the executive committee. The initial term lengths of the inaugural executive committee faculty members will be one year. Following that year, two members will be elected for two-year terms and the two others will be elected for three-year terms. Thereafter, all faculty members will serve in the executive committee for three-year terms. Members of the executive committee including the director can be reelected for up to two consecutive terms. Future members of the executive committee will be elected by the center’s faculty members. For no period of more than three consecutive terms shall the directorship be held by a person, or persons, from the same department. Designation of a Deputy Director may be necessary as the Center expands in the number of participants and in the extent (breadth) of research activity conducted by the Center. Future center directors will report to the Dean of NSS and the Vice Provost and Dean of Research. At the end of each academic year the Director will prepare an annual report which will be reviewed by the Executive Committee then submitted to the Dean of NSS and the Vice Provost and Dean of Research with copies to the Provost and Senior Vice President for Academic Affairs and the President.

Faculty members of the inaugural executive committee will be Prof. Eugene Chudnovsky and Prof. Daniel Kabat from the Physics Department and Prof. Linda Keen and Assoc. Prof. Jason Behrstock from the Department of Mathematics and Computer Sciences.

Rationale:

The abovementioned faculty members are highly successful, internationally recognized researchers and instructors in their field. They have a history of substantial grant acquisitions and show great promise to attract substantial funding in the future. These faculty members have proven to collaborate successfully and harmoniously in the framework of this proposal.

Sections 4 and 5 of this document will serve as the center’s bylaws, which may be amended by a two-thirds vote of the Center’s Executive Committee.

5. Membership

Faculty membership

Lehman faculty with focus on theoretical and/or computational sciences from all disciplines will be considered for faculty membership in the center. Faculty membership in the center will be decided by the executive committee, based on the following criteria:

- Qualification and readiness to support and mentor highest-level student research in theoretical and/or computational sciences.
- Record and/or potential to attract substantial external funding.
• Scholarly record that has received high recognition.

Faculty members of the center are eligible for the following benefits:
• Pre-negotiated reassigned time that is dependent on the amount of individual or collaborative external funding.
• Reassigned time that is awarded by the center’s executive committee and financed through the center’s funds.

Faculty members of the center are held accountable to the following expectations:
• Ongoing record of high-level scholarly activity, student mentoring, and individual or collaborative acquisition of substantial external funding.
• Alignment with the goals of the center and engagement in center activities.

Student membership

Student membership in the center will be decided by the executive committee, based on the following criteria:

• Availability of funding to support students
• Evaluation of the student’s potential to successfully pursue an academic career in theoretical or computational sciences based on the following criteria:
  o High school and/or college grades
  o Letters of recommendation from teachers and faculty
  o Student’s application materials (including an essay)
  o Interview

Student members of the center will receive
• Individual mentorship by a faculty member
• An annual stipend in addition to existing financial aid

6. Required Resources

<table>
<thead>
<tr>
<th>Item</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>2017/18</th>
<th>2018/19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stipends for students</td>
<td>$75,000</td>
<td>$125,000</td>
<td>$150,000</td>
<td>$200,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>Student research lab</td>
<td>$10,000</td>
<td>$40,000</td>
<td>$45,000</td>
<td>$5,000</td>
<td>$5,000</td>
</tr>
<tr>
<td>Faculty reassigned time</td>
<td>$30,000</td>
<td>$50,000</td>
<td>$60,000</td>
<td>$60,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>Travel funds</td>
<td>-</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>Administrative support</td>
<td>-</td>
<td>20,000</td>
<td>20,000</td>
<td>20,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Office supplies</td>
<td>-</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
</tr>
<tr>
<td>Total</td>
<td>$115,000</td>
<td>$270,000</td>
<td>$310,000</td>
<td>$320,000</td>
<td>$320,000</td>
</tr>
</tbody>
</table>
**Stipends for students**: During the first years of operation, the center expects to host approximately ten student members at any given time. Required funding: $75,000 – $250,000 annually.

**Student research lab/communal area**: A center’s hub will be a research lab/student lounge that will be located in close proximity to the offices of involved faculty (Gillet Hall or New Science building). It will be equipped with state-of-the-technology computer workstations and appropriate software. The center requires $10,000 in startup funds for furniture and computer workstations.

**Faculty reassigned time**: During the first years of operation, the center expects to include approximately ten faculty members at any given time who will be given reassigned time depending on their level of engagement. The center will require funds to hire adjuncts to compensate on average five credits reassigned time per faculty member: $6,000 per faculty member times 10 faculty members = $60,000 annually.

**Travel funds, visiting scientists and symposia**: The center expects to spend approximately $30,000 annually (from the second year onward)

**Administrative support**: Administrative support for the center will initially come from the Department of Physics. Potential changes to this arrangement will be discussed later depending on the availability of funding and size of the program.

**Funding required for the first year of operation**:

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student scholarships</td>
<td>$75,000 (six undergraduate students)</td>
</tr>
<tr>
<td>Equipment</td>
<td>$10,000</td>
</tr>
<tr>
<td>Faculty reassigned time</td>
<td>$30,000 (five faculty members at $6,000 each)</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td><strong>$115,000</strong></td>
</tr>
</tbody>
</table>

The allocation of the resources will be decided by the center’s executive council in alignment with the center’s mission and vision. The center is committed to spending at least 50% of its funds directly on students in the form of scholarships, stipends and support for research and education.

### 7. Funding Plan

We submitted a NSF-CREST proposal in summer 2013 to secure funding for the operation of the center. As of February 2014, we have not yet received a response. In case that the proposal will not be funded initially, it will be revised based on the recommendations and resubmitted. Beyond the potential prospect of NSF funding for the center, we have devised a financial plan to secure its operation:

The center will receive financial resources for its operation from

- Allocations from CUNY / Lehman College
- Student support from successful collaborative or individual external research grants from faculty members
- Overheads from successful collaborative or individual external research grants from faculty members
- External educational grants
- Foundations, donors, and corporations

A projection of financial support over time can be taken from the following table and illustration.

<table>
<thead>
<tr>
<th></th>
<th>Academic Year</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>2017/18</th>
<th>2018/19</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>College Allocations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lehman College, Office of the Provost</td>
<td>$10,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lehman College, NSS (OTPS)</td>
<td>$10,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lehman College, NSS Adjunct Budget</td>
<td>$30,000</td>
<td>$20,000</td>
<td>$10,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Overhead returns from research grants</td>
<td>$40,000</td>
<td>$60,000</td>
<td>$70,000</td>
<td>$70,000</td>
<td>$70,000</td>
<td></td>
</tr>
<tr>
<td><strong>External Sources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student support from research grants</td>
<td>$25,000</td>
<td>$40,000</td>
<td>$40,000</td>
<td>$50,000</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>Educational grant support</td>
<td>-</td>
<td>$100,000</td>
<td>$100,000</td>
<td>$100,000</td>
<td>$100,000</td>
<td></td>
</tr>
<tr>
<td>Foundations, donors, companies</td>
<td>-</td>
<td>$50,000</td>
<td>$100,000</td>
<td>$100,000</td>
<td>$100,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$115,000</td>
<td>$270,000</td>
<td>$320,000</td>
<td>$320,000</td>
<td>$320,000</td>
<td></td>
</tr>
</tbody>
</table>
The $50,000 contribution of Lehman College for the first year will be allocated as follows:

- Startup funds for the research equipment ($10,000) will come from the NSS Dean’s office OTPS funds.
- Contribution of faculty reassigned time (approximately $30,000) will come from the NSS Dean's Office.
- $10,000 for student scholarships will be allocated by the Provost’s office.

Lehman College’s contribution to the budget will decrease in years two and three and be eliminated entirely from year four onward as more funds will become available from the other sources.

Fifty percent of the overhead that is returned to Lehman College associated with the acquired external funds will be made available to the center in the first year. The rate of overhead returns for subsequent years will be negotiated. Faculty research in theoretical and computational sciences costs the college essentially nothing beyond the amount spent on a non-funded faculty member. It should therefore be straightforward to return 50% of the overhead to the center.

Donations from private donors, corporations, and foundations - in particular for student scholarships - will be solicited by the center’s director in collaboration with the Office of Institutional Advancement. These scholarships, and even the center itself, provide naming opportunities which may be used to attract donors. A strategy paper to approach companies to fund the center’s student scholarships and other STEM related initiatives at Lehman College (Science Partnership for the Bronx) is in the works.
The faculty members of the center will apply for external educational funding for the initiative. Relevant funding opportunities were already identified by the director of the Office of Grants and Sponsored Programs.

Admission of students and allocation of reassigned time will depend closely on the availability of funding. The center director is responsible for the budget and will ensure as far as possible that students who are admitted to the center will receive the center’s support up to the completion of the doctorate. “Rainy day funds” will be accumulated to ensure students’ ongoing support for years in which external funding falls short of the expectations.
8. **Timeline:**

February 2014 onward:

- Determination of founding members of the center (Responsible: NSS Dean in collaboration with senior scientists from Lehman College).
- Discussion of the initiative with the Lehman College administration and collaborative definition of specific framework (Responsible: NSS Dean and founding members).
- Drafting of the center's bylaws (Responsible: NSS Dean and founding members, in consultation and collaboration with the college administration and special counsel).
- Identification and acquisition of suitable candidates for center membership at Lehman College (Responsible: NSS Dean and founding members).
- Determination of the center’s executive committee (Responsible: Center Director and members).
- Acquisition of external funding for the initiative in the form of individual research grants and collaborative federal and private sponsoring to ensure funding for the support of students (Responsible: Center Director and members).
- Admission of students to the center based on the availability of externally acquired funding (Responsible: Center Director and members).

July 2014:

- The Center officially opens, with the award of inaugural student scholarships.