Information for Graduate Students and Faculty Advisors about the UCI MAPS NSF Graduating Training Program at UCI


Description of the MAPS Program
This is a 5-year NSF-funded training program (2016-2021) to train and support graduate students working on interdisciplinary research at the interface of (1) machine learning/statistics, and (2) the physical sciences (particle physics, chemistry, earth sciences, astronomy). An important component of the program is an emphasis on team science. Advances over the past decade in sensor technology, storage capacity, computational power, and data analysis methodologies have ushered in a new era of data-driven science. To fully realize the benefits of massive scientific data sets requires training of graduate students in the data science skills needed to extract useful information from such data. This project anticipates funding at least 20 graduate students over the duration of the program, along with a comparable number of honorary participants. The program will involve a variety of activities for students, including monthly research meetings, opportunities to meet leading researchers, participation in an annual symposium, summer internship opportunities at leading research labs, and more. For more information see https://www.nsf.gov/awardsearch/showAward?AWD_ID=1633631. The PI of the program is Padhraic Smyth (Computer Science) and the co-PIs are Pierre Baldi (Computer Science), Jim Randerson (Earth Systems Sciences), Maritza Salazar (Merage School of Business), and Daniel Whiteson (Physics and Astronomy).

Funded Fellows
- There will be a call for student applications on an annual basis in Spring quarter for students applying for funded MAPS fellowships. Funding for each student fellow will begin in Fall quarter. Students may be admitted at other times during the year in exceptional circumstances.
- NSF-funded MAPS fellowships are expected to support a student for 24 calendar months, and will include a student stipend of $36,000 per year plus all fees and tuition.
- Students will be reviewed at the end of the first 12 months and re-appointed for the 2nd year contingent on satisfactory performance in the program.
- **Important:** funded students are expected to actively participate in MAPS program activities and to engage in in-depth collaborative research involving both their primary and secondary advisors.

Honorary Fellows are PhD and MS students who participate in the MAPS program (see details below) but do not receive funding support. Students who anticipate applying to the MAPS program for funding are strongly recommended to participate first as honorary fellows.

Decisions related to student admission to the MAPS program, for both funded and honorary fellows, are made by the PI and co-PIs on the grant.

Administrative questions about the program should be directed to the program administrator, Janet Ko, at janetmk@ics.uci.edu.
### Appendix A: MAPS Program Requirements related to Student Status, Research Topic, and Faculty Advisors

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<tr>
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<th>Funded Fellows</th>
<th>Honorary Fellows</th>
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<tbody>
<tr>
<td><strong>Student Status</strong></td>
<td>Enrolled full-time as a PhD student in ICS or Physical Sciences</td>
<td>Enrolled as a PhD or MS student in ICS or Physical Sciences</td>
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<tr>
<td><strong>Residency</strong></td>
<td>US citizen or permanent resident*</td>
<td>No residency requirement</td>
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<tr>
<td><strong>Research Topic</strong></td>
<td>Either: (a) Research on a physical sciences problem that involves a strong element of machine learning or statistics; or (b) Research on machine learning or statistics methodology involving an active application to a physical sciences problem.</td>
<td>Either: (a) Research on a physical sciences problem with an interest in machine learning or statistics; or (b) Research on machine learning or statistics methodology with an interest in applications to problems in the natural sciences.</td>
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<tr>
<td><strong>Primary Advisor</strong></td>
<td>In ICS or Physical Sciences</td>
<td>Same as for funded fellows</td>
</tr>
<tr>
<td><strong>Secondary Advisor</strong></td>
<td>From ICS for Physical Sciences students, from Physical Sciences for ICS students, “Secondary advisor” means that the faculty is on the student’s advancement and thesis committees and meets on a regular basis with the student to discuss research progress.</td>
<td>Recommended but not required</td>
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* for ICS PhD students there is a possibility of funding for 1 or 2 fellowships for students that are not US citizens or permanent residents.
Appendix B: UCI MAPS Program Requirements and Recommendations for Students

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<th>Required Activities</th>
<th>For Funded Fellows</th>
<th>For Honorary Fellows</th>
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<tbody>
<tr>
<td>Graduate elective course in a student’s “other” school</td>
<td>1 course required from approved list of courses, 2nd course recommended</td>
<td>Recommended, not required</td>
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<tr>
<td>Monthly MAPS meetings during academic year</td>
<td>Attend and participate in at least 8 out of 9 meetings per year</td>
<td>Same as funded fellows</td>
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<td>Team Science activities</td>
<td>Roughly 2 hours of time per month</td>
<td>Recommended, not required</td>
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<tr>
<td>Research project meetings</td>
<td>Arrange at least 1 research meeting per month where both primary and secondary faculty advisors participate</td>
<td>At least once per quarter is recommended</td>
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<tr>
<td>Annual MAPS student symposium (Spring quarter)</td>
<td>Participation required</td>
<td>Same as funded fellows</td>
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<tr>
<td>Seminar attendance</td>
<td>Attend at least 1 research seminar per quarter in student’s other school*</td>
<td>Recommended, not required</td>
</tr>
<tr>
<td>Annual written summary report of research progress</td>
<td>Required annually in Spring quarter</td>
<td>Same as funded fellows</td>
</tr>
<tr>
<td>Complete evaluation summary for external program evaluators</td>
<td>Required (up to twice a year)</td>
<td>Same as funded fellows</td>
</tr>
<tr>
<td>Participate in a data science** short course or hackathon</td>
<td>Required (once per year, as attendee or TA).</td>
<td>Recommended, not required</td>
</tr>
</tbody>
</table>

* “other school” means ICS for Physical Sciences students and Physical Sciences for ICS students. Students are encouraged to get on department/school seminar mailing lists.

**short courses and hackathons are sponsored by the Data Science Initiative: see [http://datascience.uci.edu/](http://datascience.uci.edu/) for announcements by beginning of each quarter.

**Recommended Program Activities for Students**

The following activities are recommended for all students participating in the MAPS program. The MAPS program staff will assist students in providing contact information for summer internships, outreach opportunities, and so forth.

- Co-author a paper with both your primary and secondary advisor
- Participate in an outreach activity at a local community college or high-school, e.g., volunteer to give a 30 minute talk on data-driven science or on machine learning or statistics
- Take at least one Graduate Professional Success (GPS) Course, run by the UCI Graduate Division. These courses cover topics such as teaching, leadership, communications, entrepreneurship, and more. For more details see [http://www.grad.uci.edu/professional-success/index.html](http://www.grad.uci.edu/professional-success/index.html)
Appendix C: Recommended List of Graduate Elective Courses

The following courses have been approved as satisfying the requirement for an elective course (for funded fellows). Students seeking exceptions to pursue other courses as exceptions should send a request by email to Janet Ko, janetmk@ics.uci.edu, cc’ing the program director Padhraic Smyth (smyth@ics.uci.edu), with a clear justification for the request. For example, due to lack of prerequisites, students have been granted permission in the past to take undergraduate versions of some of the graduate courses below.

Students who have already taken one of these courses prior to entering the program should email Janet Ko with the relevant information.

For Physical Sciences Students:

- **Computer Science**
  - CS 273A: Machine Learning (typically offered in Fall and Winter)
  - CS 276A: Neural Networks (typically offered in Winter)
  - CS 216: Image Understanding
  - CS 242: Parallel Computing
  - CS 260: Fundamentals of Algorithms

- **Statistics**
  - Stats 225: Bayesian Statistical Analysis
  - Stats 230: Statistical Computing Methods
  - Stats 245: Time Series Analysis

For Information and Computer Sciences Students:

- **Physics and Astronomy**
  - PHY 136: Introduction to Particle Physics
  - PHY 137: Introduction to Cosmology
  - PHY 212A: Mathematical Physics

- **Chemistry**
  - CHEM 201: Organic Reaction Mechanisms 1
  - CHEM 202: Organic Reaction Mechanisms 2
  - CHEM 204: Organic Synthesis I

- **Earth Science**
  - ESS 212: Geoscience Modeling and Data Analysis
  - ESS 222: Global Climate Change Impacts
  - ESS 228: Geophysical Fluid Dynamics