

## RESEARCH OPPORTUNITY

### *Interface of the Natural Sciences and Data Sciences*

This call for proposals is funded in part by the Gordon and Betty Moore Foundation through Grant GBMF3941 to Columbia University and the Alfred P. Sloan Foundation.

#### **Funding:**

Funding will be provided for three pairs of faculty and their doctoral students. Each pair will consist of one doctoral student from the Natural Sciences\* and one from Data Science\*\* who will work collaboratively along with the two students' faculty advisors. Each of the three themed clusters will be funded for 16 months. Funding includes a portion of faculty salary, doctoral student stipend, tuition and fees, plus up to \$1500 per individual for travel expenses to present the cluster's research results at a conference. Funding also includes administrative support that will be managed centrally within the Institute for all three clusters to assist with meetings, workshops and presentations. **See appendix A for outline.**

#### **Purpose:**

It is clear that research efforts which incorporate both domain expertise in the natural sciences and sophisticated understanding of fields such as statistics and computer science can make dramatic advances – for example, this year's Nobel Prize in Chemistry was awarded for “the development of multiscale models for complex chemical systems.” Nevertheless, traditional doctoral programs do not always easily allow for such interchange. This program is designed to enhance the ability of doctoral students in the Natural Sciences to learn how to use data science techniques in their research, and for doctoral students in data science fields to interact with domain specialists in order to learn how to apply their work within a domain.

#### **Funding Requirements:**

In addition to the cross-fertilization of data science and the natural sciences within each themed cluster, participants will be expected to hold bi-weekly meetings of all the faculty and students to forge a larger academic cohort of researchers who can explore the intersection of data science and the natural sciences in the context of sharing research questions and results, as well as opportunities and challenges in the integration of data science and the natural sciences. The larger cohort will also produce a white paper that proposes the form of a new natural science focused center(s) for Columbia's Institute for Data Sciences and Engineering, and pathways forward for firmly integrating data science with natural science at Columbia. Grant requirements will also include quarterly in-person or telephone meetings with the Foundations, as well as participation in an annual site visit. Annual narrative and financial report is also required. At the close of the 16 month fellowship, a final narrative and a financial report will be required.

**See appendix B for additional information on grant requirements (data management/IP).**

\* Natural Sciences, may be defined as:

- Natural Sciences include chemistry, astronomy, physics, non-human biology, non-human neuroscience, climate science, nano and material science. Note that human health is not an area that will be supported by this solicitation.

\*\*Data Science, may be defined as:

- Data Sciences include expertise that can be found in Applied Math, Computer Science, the Graduate School of Architecture, Planning and Preservation (where there is expertise in data visualization), Industrial Engineering and Operations Research, Journalism (also for data visualization), and Statistics.

### **Proposal Timeline:**

Thursday, May 8<sup>th</sup>, 2014, 3:00 p.m. *Information Session & Networking Event*

Costa Engineering Commons – Room 750 Schapiro CEPSR – 530 West 120<sup>th</sup> Street –Morningside Campus

Attend this session to learn more about this funding opportunity that is being provided in part by the Gordon and Betty Moore Foundation through Grant GBMF3941 to Columbia University and the Alfred P. Sloan Foundation.

Monday, June 9<sup>th</sup>, 2014, 4:00 p.m. *Proposal Submission Deadline*

Monday, June 30<sup>th</sup>, 2014, 5:00 p.m. *Anticipated Award Notifications*

See appendix C for estimated timeline for those who have been selected for this grant funding opportunity.

### **Proposal Format:**

Submit the following materials via email, in .doc or .pdf format, to Jonathan Stark, Director of Operations for the Institute for Data Sciences and Engineering (IDSE), [jrs2139@columbia.edu](mailto:jrs2139@columbia.edu), by the Monday, June 9th, 2014, 4:00 p.m. deadline:

- Application Cover Page, Project Proposal & Budget
- CV's for PI's ([2 page NSF style format](#)) and doctoral students where possible

### **Proposal Reviews:**

The Institute for Data Sciences and Engineering's review committee for submitted proposals may consist of members of the IDSE Executive Board and Center Chairs. An external reviewer (domain expert) may be asked by the review committee to assist with review process. In an effort to mitigate conflicts of interest, members of the review committee who are included in others' proposals, or who wish submit a proposal in their respective research area, will be excused from the review process and any decision regarding proposal funding.

### **About the Gordon and Betty Moore Foundation:**

The Gordon and Betty Moore Foundation believes in bold ideas that create enduring impact in the areas of science, environmental conservation and patient care. Intel co-founder Gordon and his wife Betty established the foundation to create positive change around the world and at home in the San Francisco Bay Area. Science looks for opportunities to transform—or even create—entire fields by investing in early-stage research, emerging fields and top research scientists. Environmental conservation efforts promote sustainability, protect critical ecological systems and align conservation needs with human development. Patient care focuses on eliminating preventable harms and unnecessary healthcare costs through meaningful engagement of patients and their families in a supportive, redesigned healthcare system. Visit [Moore.org](http://Moore.org) or follow @MooreScientific.

### **About the Alfred P. Sloan Foundation:**

The Alfred P. Sloan Foundation believes that a carefully reasoned and systematic understanding of the forces of nature and society, when applied inventively and wisely, can lead to a better world for all. The Foundation makes grants to support original research and broad-based education related to science, technology, and economic performance; and to improve the quality of American life. Though founded in 1934 by Alfred P. Sloan Jr., then-President and CEO of General Motors, the Foundation is an independent entity and has no formal relationship with the General Motors Corporation. The Foundation is unique in its focus on science, technology, and economic institutions. It believes the scholars and practitioners who work in these fields are chief drivers of the nation's health and prosperity. In each grant program, the Foundation seeks proposals for original projects led by outstanding individuals or teams.

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## Application Cover page

CONTACT INFORMATION (PI's and doctoral students if known)					
First Name	Last Name	Title	Dept.	Email	Phone
SCOPE OF PROPOSAL					
Title of Proposal		Appendixes (A-C)		Acknowledgement	
		Due to the funding responsibilities from our sponsors, please acknowledge that you have read, reviewed, and agree with the requirements of the funding should your proposal be selected. Please use the check box to indicate that you have read the terms and conditions of this solicitation.			
PROPOSAL REQUIREMENTS: Due Monday, June 9 <sup>th</sup> , 2014, 4:00 p.m.					
Please provide the following information:					
<ul style="list-style-type: none"> <li>• A. Completed Application Cover page</li> <li>• B. Project Proposal* (7-page maximum, single space, 12-font, Times New Roman)</li> <li>• C. Budget and budget narrative (1-page)</li> <li>• C. CV's for PI's (<a href="#">2 page NSF style format</a>) and bios for doctoral students if available.</li> </ul>					
*	<p><b>The following criteria will be used in ranking and selecting submissions for funding opportunity:</b></p> <ol style="list-style-type: none"> <li>1. Identifies why such a proposal would not be funded by more traditional funding opportunities.</li> <li>2. Identifies unique and novel approaches the group will employ to expand the Institute's integration between data science methodologies and scientific disciplines by supporting new themed clusters of faculty and PhDs in the natural sciences and data sciences.</li> <li>3. Aims to identify best practices and research results across campus, as well as the potential to impact researchers external to Columbia, in an effort to highlight the benefits of integrating data science methodologies with the natural sciences.</li> <li>4. The proposed research must be consistent with the mission of the Institute while aiming to advance the support and development of a new center on data and the natural sciences.</li> <li>5. The proposed clusters and research must include involvement with natural science and data science collaborators at Columbia University.</li> <li>6. The proposal must show that the PIs can make significant progress over a 16 month period.</li> </ol>				

# APPENDIXES

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## APPENDIX A (Suggested Template)

PI Names:

Project Title:

Anticipated Project Period: 9/1/14-12/31/15

	Rate	Effort	Cluster	Notes
PI-Data Science	\$13,000	1	\$ -	This rate is locked, please adjust your effort level to this amount
PI-Natural Science	\$13,000	1	\$ -	This rate is locked, please adjust your effort level to this amount
GRA-Data Science		16	\$ -	Please use your standard rates specified by your department for GRA Stipend, Tuition and fees
GRA-Natural Science		16	\$ -	
<b>Salaries</b>			<b>\$ -</b>	
Fringe 33.2%			\$ -	Fringe rates effective 7/1/14
<b>Total S&amp;W, Fringe</b>			<b>\$ -</b>	
Domestic travel (1 trip per PI & PhD)	\$1,500		\$ -	
Computer Fees*** (If Applicable)			\$ -	Computer Fees are excluded from IC calculation as per Foundation Policy
Health/Medical Fees (if Applicable)			\$ -	Please use your standard rates specified by your department for GRA Stipend, Tuition and fees
Other Fees (if Applicable)			\$ -	
GRA Tuition			\$ -	
<b>Total non S&amp;W</b>			<b>\$ -</b>	
Total Direct Cost			\$ -	
Total MTDC			\$ -	
ICR 12.5%			\$ -	IC rate is 12.5% and excludes tuition and computer fees.
<b>TOTAL</b>			<b>\$ -</b>	
Target			\$ 305,000	

No other funding categories are eligible for consideration under this solicitation. Please note that the proposals that are successful for this funding opportunity will be provided with an outline of items that would need to be included with future financial reports due to our sponsors throughout the duration of the funding period.

## **APPENDIX B**

### Key Terms & Conditions

#### Information and Data Sharing:

The parties understand that a material condition of this Grant Agreement is that Columbia makes the data, research, knowledge and other information developed with any Grant funds freely accessible to the Foundation, other grantees of the Foundation and the public generally. In addition, Columbia will make such data, research, knowledge and other information available consistent with typical academic practices.

#### Intellectual Property:

Any intellectual property that Columbia, and any of its agents, employees or contractors, creates by the performance of this Grant Agreement (the "Grant Works"), hereby vests in and shall be the property of Columbia.

#### Open Source Software License:

Columbia agrees to make the Grant Works, solely to the extent such Grant Works constitute software, freely available via an open source license, similar in intent to the progressive copyright licenses such as Apache or BSD-style software licenses, which permit anyone to subsequently commercially license such Grant Works constituting software.

## **APPENDIX C**

### Anticipated Grant Outcomes & Requirement Plan (Subject to modification)

<b>Requirement Due Date</b>	<b>Type of Requirement</b>	<b>Description of Report/Activity</b>
June 9 <sup>th</sup> , 2014, 4 p.m.	Proposal Due	As described on required cover page
June 30 <sup>th</sup> , 2014, 5 p.m.	Anticipated Notification of Award	Email announcement to PIs
July 14 <sup>th</sup> , 2014	In-person/phone meeting with sponsors for updates	This may include meet and greets for awardees with sponsors
October 6 <sup>th</sup> , 2014	Progress Report	To be shared with sponsors on 10/14/14
October 14 <sup>th</sup> , 2014	In-person/phone meeting with sponsors for updates	
January 5 <sup>th</sup> , 2015	Progress Report and Planning for Summer Workshop	To be shared with sponsors on 1/14/15
January 14 <sup>th</sup> , 2015	In-person/phone meeting with sponsors for updates	
March 2 <sup>nd</sup> , 2015	Planning meeting for Site Visit & Summer Workshop	Prepare for site visit with sponsors on 4/14
April 6 <sup>th</sup> , 2015	Progress Report Preparation for Site Visit	Prepare for site visit with sponsors on 4/14
April 14 <sup>th</sup> , 2015	Site Visit	Assess Progress
May 1 <sup>st</sup> , 2015	Annual Narrative & Financial Report	Yearly summary of activities and results to date to be shared by 5/14/14 deadline
June 2015	Summer Workshop (TBD)	Workshop to highlight benefits of integrating data science methodologies with those in natural sciences
July 14 <sup>th</sup> , 2015	In-person/phone meeting with sponsors for updates	
Future requirements to be assigned (i.e. White Paper, Final Narrative & Financial Report)		

Full terms and conditions will be provided to the awardees.