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### Alliance Research Internship Program at Columbia University

#### Academic year 2017 - 2018

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Created in 2002, the [Alliance Program](#) is an innovative joint-venture between Columbia University, the École Polytechnique, Sciences Po, and Paris 1 Panthéon-Sorbonne University. Every year, Columbia University offers a number of student internships in scientific disciplines, which are open to École Polytechnique students. The process for applying to these internships is outlined below.

#### Internship Description

- Students work with a faculty member, who acts as an academic advisor and supervises their research project.  
**Internships start in March 2018.** The duration, objectives and tasks of the internship will be discussed with the supervisor at the host center or department.
- Internships are not paid. **If compensated, it will be specified in the offer.**
- **Students are responsible for finding housing.**
- **All students are required to apply for a J1 Student Intern Visa to conduct an internship in the United States.**  
**Please note that \$500 fees are required by Columbia University to process the visa.**  
**If visa fees are sponsored by the host department, it will be indicated in the offer.**

#### Applications requirements

- Applicants must include: a CV, a cover letter (1 page), and a letter of recommendation.
- Students should send their application to the Alliance Program to:  
[alliance@columbia.edu](mailto:alliance@columbia.edu)
- To protect confidentiality, faculty members should send the letter of recommendation directly to:  
[alliance@columbia.edu](mailto:alliance@columbia.edu)
- All materials must be submitted in English.

**Deadline: December 15, 2017**

### DEPARTMENT OF NEUROSCIENCE

**1. Faculty Sponsor:**

Rudy Behnia, assistant professor of neuroscience <http://behnialab.neuroscience.columbia.edu/>

**2. Number of interns: One (1)**

**3. Type of support available:**

- ✓ Stipend
  - ✓ Access to campus services and facilities
  - ✓ Immigration and visa assistance/sponsor
- Will assist in finding accommodation

**4. Internship Title:**

Building a behavioral assay for color vision in *Drosophila*

**5. Description:**

How are colors encoded in the brain? Despite decades of research, this question remains unanswered. My lab is interested in deciphering the neural computations underlying color vision by exploiting the genetic toolkit of *Drosophila* to ask how spectral information from photoreceptors in the eye is combined to encode colors in the brain. We combine electrophysiological recordings, 2-photon activity imaging in live animals in response to visual stimuli with behavioral assays to characterize the role of specific neurons in color encoding. The intern will be involved in the process of setting up an advanced visual stimulus system for color vision and using it to set-up a behavioral assay to test color learning in fruit flies.

**6. Skills:**

Coding (Matlab and/or python) and quantitative methods, optical/mechanical/electrical engineering background encouraged but not necessary.

**7. Additional Information:**

We will be moving to the new Zuckerman Mind Brain and Behavior Institute (<http://zuckermaninstitute.columbia.edu/>) early 2018.

**1. Faculty Sponsor:**

Dr. Vittorio M. Canuto - Adjunct Professor of Applied Physics and Applied Mathematics

**2. Number of interns:**

One (1)

**3. Type of support available:**

- ✓ Stipend
- ✓ Visa assistance/sponsor

**4. Internship Title:**

Mixing processes in the ocean to be used in climate studies

**1. Faculty Sponsor:**

Professor Marc Levy

**2. Number of interns:**

1 or 2 students.

**3. Type of support available:**

- ✓ The intern will work collaboratively with other CIESIN staff in the GRID project.
- ✓ Qualified CIESIN staff will provide in-house GIS training at no cost.
- ✓ GRID's Principal Investigators (PIs) and CIESIN staff involved in GRID will provide research guidance and support throughout the internship.
- ✓ Access to both Lamont and Morningside campus services and facilities.

**4. Internship Title:**

Effective and sustainable use of geospatial data for decision-making in complex settings: a comparative case study.

**5. Description:**

A bold statement towards global sustainable development was made when all UN member states unanimously adopted 17 sustainable development goals, and agreed to work together to achieve those goals. As SDGs came into force in 2016, the need to mobilize and/ or generate integrated, timely, and trustworthy information and data systems became imminent, especially in countries where these types of infrastructures have never been in place, or have had serious gaps in the past. Geographic Information Systems (GIS), Volunteered Geographic Information (VGI), as well as other geospatial data sources and platforms have been identified as strong tools for SDG monitoring under the 'Leave No-one Behind' approach. In places where complex (and at times unstable) political, social, economic, institutional, and environmental challenges prevail, there is the question of whether governments would have the capacity to mobilize resources, adopt, use, and maintain such data and information platforms, in a way that could lead to better decision-making and real-time citizen feedback.



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CIESIN is a partner within GRID, a global initiative supported by the Bill & Melinda Gates Foundation (BMGF) and the UK's Department for International Development (DFID). The GRID project aims to enable governments to collect, use, and share high-population, settlement, and infrastructure data by providing technical assistance to governments and the civil society. Therefore, GRID works with governments on: data acquisition (geo-referenced census, satellite imagery processing, hand-held data collection, etc.); methodologies (sampling frames, estimation models, data analytics); data infrastructure (how to store, share, and analyze data); data use (plans, programs & project design, research, education, etc.); and data governance (enabling legal and institutional environments).

GRID's current, targeted countries include Ethiopia, the Democratic Republic of the Congo (DRC), Nigeria, Tanzania, Uganda, and Zambia.

CIESIN is looking forward to host up to two students from l'École Polytechnique who could be part of the in-house research team, focusing on the institutional and/or legal frameworks within countries in order to effectively adopt and maintain geospatial data and information systems. The selection of countries to work with will be agreed directly with the student.

A proposed, broad outline/agenda for research may include:

- Comparative case studies research methodologies.
- Institutional and/or legal frameworks, requisites, conditions within countries for effective adoption and use of geospatial data and information systems. Document lessons learned in other parts of the world.
- Current state of the institutional and/or legal frameworks within GRID's target countries.
- Which aspects could be adopted/ fully- applied? Which aspects would be challenging/ limited implementation? What are the pre-conditions for effective geospatial data use and integration? What are the incentives for governments to adopt GIS approaches towards policy planning and decision-making? Are there any specific reasons why governments many not want to adopt these types of data systems?

### 6. Skills:

- Studies in Political Science, Social Sciences, African Studies, Legal studies related to data security policies and/or related fields.
- Strong social sciences research and analysis background.
- Interest in learning about and/or conducting research about ways of integrating geospatial data systems, data integration platforms, and/or data security policy aspects within governance structures in developing countries.
- No previous knowledge of GIS/ VGI is required. However, the student will be introduced and taught into these tools, in order to get a better understanding of what is needed while conducting this type of research.
- Fluency in both English and French is required. Fluency in other languages such as Kiswahili, Amharic, and/or Oromo are considered assets.

### 7. Additional Information:

The Center for International Earth Science Information Network (CIESIN) is a center within the Earth Institute at Columbia University. CIESIN works at the intersection of the social, natural, and information sciences, and specializes in on-line data and information management, spatial data integration and training, and interdisciplinary research related to human interactions in the environment.



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### COLUMBIA UNIVERSITY RESEARCH GROUPS

Please find below a list of some Columbia University Research Groups.

- ***Please note this list is not exhaustive and only includes some Departments that you might be interested in.***
- If you need to find the address email of a faculty/contact at Columbia University, please go to <http://www.columbia.edu/content/university-news.html>

On the top of the page, please type the name of the person and you will access his exact department and contact information



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<b>FU FOUNDATION SCHOOL OF ENGINEERING AND APPLIED SCIENCE</b>	<a href="#"><u>Research Involvement Program</u></a>
<b>APPLIED PHYSICS AND APPLIED MATHEMATICS</b>	
Applied Physics	<a href="#"><u>Research Groups</u></a>
Applied Mathematics	<a href="#"><u>Research Groups &amp; Centers</u></a>
Materials Science and Engineering	<a href="#"><u>Research Groups</u></a>
<b>BIOMEDICAL ENGINEERING</b>	
Cell and Tissue	<a href="#"><u>Research Groups</u></a>
Biosignals and Biomedical Imaging	<a href="#"><u>Research Groups</u></a>
Biomechanics	<a href="#"><u>Research Groups</u></a>
<b>CHEMICAL ENGINEERING</b>	
Molecular Design and Modification of Material Surfaces	<a href="#"><u>Research Group</u></a>
Biophysics and Soft Matter Physics	<a href="#"><u>Research Group</u></a>
Genomics Engineering	<a href="#"><u>Contact</u></a>
Interfacial Engineering and Electrochemistry	<a href="#"><u>Contact</u></a>
Protein and Metabolic Engineering	<a href="#"><u>Contact</u></a>
<b>CIVIL ENGINEERING AND ENGINEERING MECHANICS</b>	
Research Groups	<a href="#"><u>Research Groups</u></a>
<b>COMPUTER ENGINEERING</b>	
Computer Science	<a href="#"><u>Research Groups</u></a>
Electrical Engineering	<a href="#"><u>Research Areas</u></a>







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EARTH AND ENVIRONMENTAL ENGINEERING	
Environmental Health Engineering	<a href="#">Research Groups</a>
Sustainable Waste Management (SWM)	<a href="#">Research Groups</a>
Water Resources and Climate Risks	<a href="#">Research Groups</a>
BIOLOGY	
Dept. of Biology	<a href="#">Research Groups</a>
CHEMISTRY	
Dept. of Chemistry	<a href="#">Research Groups</a>
PHYSICS	
Dept. of Physics	<a href="#">Research Groups</a>
INDUSTRIAL ENGINEERING & OPERATIONS RESEARCH	
The Center for Financial Engineering	<a href="#">Research Centers</a>
NEUROSCIENCE	
Dept. of Neuroscience	<a href="#">Research Areas</a>
Centers and Institute	<a href="#">Contacts</a>
ASTRONOMY	
Dept. of Astronomy	<a href="#">Research Groups</a>