CEE Gateways to France – A Program sponsored by the National Science Foundation

Purpose: Building long-term collaborations between Georgia Tech (GT) professors and faculty from top engineering schools of the Paris area through regular GT student internships in France and mutual visits.

Supporting Grants:

2014-2019: Coupled Geomechanical Processes and Energy Technologies - Research Experience at Ecole des Ponts Paris Tech (ENPC, France), National Science Foundation, International Research Experiences for Students, Grant no. 1357908

2019-2022: IRES Track I: Mechanics of Porous Media across Scales - Research Experience in Paris (MPMS), National Science Foundation, International Research Experiences for Students, Grant no. 1854030

Typical sequence of activities

	Students	**Faculty Mentors / Coordinators**
November	GT mentors and alumni present the CEE Gateways program at the GELM/Mundy Scholars Panel during GT International Education Week, to inform and recruit students (undergrad and grad).	
November - December	Interested GT undergrad and grad students propose a research plan to GT advisors.	
January - February		GT mentors help students define specific research objectives and tasks.
	Research internship abstracts (containing the title, objectives and work plan) are submitted to Dr. Arson (PI).	If the GT mentor does not have a partner in Paris, Dr. Arson (PI) assists in finding a French host for the project.
March	Once dual mentors are assigned to all projects, program coordinators examine applications and select the cohort of participants based on specific academic criteria and based on the availability of funds.	
April - May	Selected participants work with their GT and French mentors via video-conferencing media and electronic communication to finalize the work schedule, identify the resources needed for the internship (e.g., software, experimental supplies), start the literature review and take any required training before starting the research tasks.	
	Dr. Arson (PI) periodically meets the selected participants to supervise travel logistics and organizes meet ups to introduce students to the French academic environment, the Paris student life (e.g., daily routine, public transportation), French culture and language basics.	
May - August	**Students conduct research for two months in Paris.** Each student gives a research presentation on site.	Program coordinators regularly meet with students. If possible, one or two GT mentors spend a week in one of the French labs.
September	GT students submit a research report to their mentors and coordinators, in the form of a journal manuscript. Metrics are included in the yearly NSF report (e.g., publications).	
October	GT students present their research work at the Geosystems Poster Symposium to 100+ attendees including engineers, GT undergrad and grad students, GT faculty.	One or two French mentors spend(s) a week at GT, as visiting scholar(s).

Requirements for interested students:

- Be a US Citizen, national or permanent resident in good academic standing; applications from members of underrepresented groups in science and engineering are encouraged
- Be an undergraduate or graduate student majoring in Engineering
- Be in good academic standing
- Have the approval of their Georgia Tech advisor
- Be available for travel from approximately May 15th through July 31st
- Must submit a research abstract to Dr. Arson to apply (see sequence of activities above)
- Complete an on-site research presentation and participate in a GT based research symposium detailing research findings and program outcomes
- Submit a final research report
- Act as an ambassador of the CEE Gateways Program to help to recruit new participants

The partnering French laboratories

Navier Laboratory hosts 58 researchers and 90 Ph.D. students and is equipped with some unique large facilities, including: an X-ray microtomographer that can scan geomaterials during mechanical, hydraulic or chemical loading; a neutron magnetic resonance apparatus for civil engineering applications; several computation clusters oriented towards the simulation of particulate materials and molecular dynamics. The laboratory also has several state-of-the-art high pressure and high temperature loading cells to test geomaterials under deep reservoir conditions. Visiting students will have the opportunity to be trained in the use of these facilities and to be mentored by world experts in unsaturated geomaterials, poromechanics, and CO_2 storage.

Laboratory website: https://navier.enpc.fr

Hosting engineering school: Ecole des Ponts Paris Tech (ENPC)

French program coordinator: Dr. Jean-Michel Pereira (jeanmichel.pereira@enpc.fr)

Mentors already in the program: Dr. Laurent Brochard (laurent.brochard@enpc.fr), Dr. Adelaïde Ferraille (adelaide.feraille enpc. f), Dr. Jean-Michel Pereira (jeanmichel.pereira@enpc.fr), Dr. Amade Pouya (amade.pouya@enpc.fr), Dr. Matthieu Vandamme (matthieu.vandamme@enpc.fr)

IFSTTAR, a research institute on infrastructure and transportation, has six campuses including one adjacent to ENPC. IFSTTAR employs over 1,000 researchers and has a yearly budget of over €105M. IFSTTAR labs own facilities for testing full-scale civil engineering structures, a centrifuge and multiple benches to test vehicles in various weather conditions. It also owns large computation platforms.

Laboratory website: https://www.ifsttar.fr/en/welcome/

Hosting engineering school: Ecole des Ponts Paris Tech (ENPC)

French program coordinator: Dr. Jean-Michel Pereira (jeanmichel.pereira@enpc.fr)

Mentors already in the program: Dr. Véronique Baroghel-Bouny (veronique.baroghel-bouny@ifsttar.fr), Dr. Sébastien Brisard (sebastien.brisard@ifsttar.fr)

MSSMat counts 19 researchers, 39 doctoral students and 8 post-doctoral fellows, who work in mechanics, physics, biology and applied mathematics, with applications in risk, transportation, energy, nanomaterials and biomechanics. Software developed at MSSMat (e.g., GEFdyn, OOFE) will be accessible to IRES students for free. The laboratory owns cutting-edge mechanical testing devices such as a hydraulic press for high temperature conditions, nanoindenters, RX diffractometers and torsion frames. In addition to those, IRES students will have the opportunity to work with a broad range of microscopy instruments, including a TEM.

Laboratory website: http://www.centralesupelec.fr/en/soil-structures-and-materials-mechanics-laboratory-mssmat-umr-cnrs-8579

Hosting engineering school: Ecole Centrale-Supélec (ECP)

French program coordinator: Dr. Elsa Vennat (elsa.vennat@centralesupelec.fr)

Mentors already in the program: Dr. Elsa Vennat (elsa.vennat@centralesupelec.fr)

The 31 researchers and 39 doctoral students working at LMS focus on multi-scale mechanical modeling, behavior and durability of structures, biomechanics and mechanobiology. The lab owns a computation platform with 624 nodes and 6 To of storage (mostly used for FEM and MD) and a variety of static and dynamic testing devices, e.g., hydraulic electro-mechanical presses, Hopkinson bars, micro-scale loading frames coupled to image acquisition systems, extensometers, environmental chambers, triaxial loading cells. The lab is equipped with advanced microscopy instruments and manufacturing devices, such as high precision 3D printers. IRES students will receive ad hoc training to use these resources.

Laboratory website: https://portail.polytechnique.edu/lms/en

Hosting engineering school: Ecole Polytechnique Paris Tech (X)

French program coordinator: Dr. Elsa Vennat (elsa.vennat@centralesupelec.fr)

Mentors already in the program: Dr. Jean-Marc Allain (allain@lms.polytechnique.fr)

Logistics

Registration at Georgia Tech: Please talk to your research advisor at Georgia Tech to decide of the best way to register at Georgia Tech for the semester(s) when you will be abroad. Most likely, you will continue to receive your research assistantship from your advisor when away, but the payment of the tuition depends of your status (e.g., GRA vs. GA). The best status to opt for depends on how many weeks within a semester you are off campus.

Global Internship Program: To get credits for your internship abroad, please sign up for this program with Mr. Tony Gallego (anthony.gallego@ce.gatech.edu) once you are officially admitted to the CEE Gateways to France program. Here is the website:
https://oie.gatech.edu/gip/home
Note that you have to spend a minimum number of weeks abroad within a given semester to be eligible to apply to the Global Internship Program (GIP). The GIP gives you access to an international travel insurance plan (see below).

Visa: None needed if you are a U.S. Citizen. Please check requirements if you are a permanent resident and not a U.S. Citizen.

Travel Authorization From (TAR): Please work with Jennifer Freeman (jennifer.freeman@ce.gatech.edu), Assistant to the Geosystems Group, to prepare a TAR. Please copy Dr. C. Arson (chloe.arson@ce.gatech.edu) in your correspondence so that follow ups can be made, e.g. research account number.

Insurance: You are free to use your own insurance as long as your plan covers international travel. Past experience indicates that it is useful to be insured for repatriation, in case you are injured, for instance. If you sign up for the Global Internship Program (GIP), you can opt for the Cultural Insurance Services International (CISI) travel insurance plan through the University System of Georgia ($125 via Bursar charge). Unrelated to the CISI, more information about Georgia Tech student health insurance plans is available at this website:
https://health.gatech.edu/finance/insurance

Budget: Participants will receive a $3,000 stipend for the whole duration of the internship, and will be reimbursed for travel, accommodation and other miscellaneous expenses, up to $5,250 for two months.

Flights: Because the program is federally funded, you will have to reserve a flight with a U.S. carrier. A lot of companies that fly between the U.S. and Paris are partners of Delta or of another U.S. airline, so the federal requirements do not really put a limitation on flight options. Please submit your flight preference to Dr. Arson (chloe.arson@ce.gatech.edu) for approval. If approved, then follow up with Jennifer Freeman (jennifer.freeman@ce.gatech.edu), Assistant to the Geosystems Group, to book the flights. That way, you will not have to pay and then wait to be reimbursed.

Accommodation:
At ENPC, it is recommended to use the residence that is reserved for visiting scholars, 5 minutes walk from the school, 10 minutes from the train station that brings you to the historical center of Paris, and 10-15 minute walk from a small mall where you can shop your groceries. It is safe and cheap(er):
https://access.ciup.fr/logement-en-ile-de-france/la-residence-internationale/
You may have to send multiple emails because the management office is not very responsive. But generally, the residence is a good option, with several studio sizes available.
At ECP and at Polytechnique (X), it is recommended to use the students' residence Jean Restignat in Cachan (in between the ECP and X campuses on the one hand, and Paris on the other hand, close to the suburban train line):
https://www.residence-etudiante-restignat.fr/en
La Fondation des Etats-Unis (FEU – the Foundation of the United States) is a great option for the ones working at Ecole Polytechnique. It a an hour commute to Ecole des Ponts and 40 minutes to Ecole Polytechnique. It offers a very inter-disciplinary environment, mixing scientists and artists, in downtown Paris!
http://www.feusa.org
The Cité Internationale Universitaire de Paris, in the heart of Paris, is a great option if you do not mind long commutes by public transportation. The advantage is that you can better enjoy the city after work hours. The application process is pretty straightforward, but be prepared to wait a long time before getting a response:
http://www.ciup.fr/en/houses/
You are free to book something else, but travel reimbursement allowance is limited…

Ground Transportation: The Régie Autonome des Transports Parisiens (RATP) manages most of the public ground transportation options in Paris, including the metro in Paris *intra muros*, the RER suburban trains (Réseau Express Régional, RER) and the buses. Note that ENPC is in transportation zone 4 out of 5 zones (zone 1 being Paris *intra muros*). ECP and X are in zone 5. You can purchase a weekly pass for all transportation zones from Paris *intra muros* to remote suburban zones for about 23 euros a week. Check out "Navigo pass" options at this website: https://www.ratp.fr/en

Cell Phone: Before you depart, please check with your U.S. carrier that your contract allows you to communicate abroad; you may have to extend your plan temporarily.

Credit Cards: Most places in France will not take American Express. Please make sure that you have an alternative credit card that will work in France (Visa and Master Card are widely accepted; please check if you have any fees when using your card abroad).

A few tips that will improve and enrich your experience in Paris

- Please send your itinerary to Dr. Arson (chloe.arson@ce.gatech.edu) once your accommodation and flights are booked. That will help organizing events for the entire cohort, at Georgia Tech or in Paris.
- About a week before your expected arrival date, send an email to your French advisor. Professors are very busy and sometimes forget the exact starting date of internships. By sending an email, you increase your chances to have an office ready for you when you arrive.
- Similarly, touch base with the accommodation manager to make sure that somebody will be at the reception when you arrive. Beware of holidays!
- Once you are in your hosting laboratory, do not hesitate to ask for a tour of the facilities to your French advisor. Also ask to be introduced to the staff and to other students of the laboratory. That will make you day-to-day life much smoother.
- Past experience indicates that getting in involved in an activity helps socialize with lab members outside of normal office hours. For instance, going to the gym, running, playing soccer, touring museums on Thursday nights (free for students) and cooking are quite popular activities among Ph.D. students in Paris. If you like sports, bring some active gears with you, you may need them!
- Be prepared for some cultural differences
    - Administration is indeed quite slow in France…
    - Public transportation in Paris is wonderful but sometimes it does not work because of scheduled or unscheduled maintenance, and because of strikes. Make sure to check the night schedule because surprisingly, you do not have that many trains at night and there are less trains during the week-end.
    - If there is a heat wave, remember, you will not have the air conditioning in your room (French housing is just not designed this way). It is advisable to buy a fan (20 euros or so) and perhaps a mosquito net (if you like to keep your window open).

List of Almumni

Year	Last, First Name	Advisors	Topic
2015	Armstead, Taylor	Dr. A Pouya (ENPC) Dr. C. Arson (GT)	Theoretical modeling of salt rock permeability upon damage and healing processes
	Clark, Jamie	Dr. A. Ferraille (ENPC) Dr. Kim Kurtis (GT)	Life cycle analysis of cementitious materials
	Mayercsik, Nathan	Dr. M. Vandamme (ENPC) Dr. K. Kurtis (GT)	Entrained Air Void System in Cement-Based Materials: Imaging and Poromechanical Modeling
	Peralta, Andres	Dr. J.-M. Pereira (ENPC) Dr. D. Frost (GT)	Identification of Optimum Aggregate Gradation for Transportation Applications of TriAx Geogrids
	Wirth, Xenia	Dr. L. Brochard (ENPC) Dr. S. Burns (GT)	Heavy Metal Adsorption in Porous Carbons
2016	Burris, Lisa	Dr. M. Vandamme (ENPC) Dr. K. Kurtis (GT)	Modeling physical salt attack in concrete using pore size and mass transport properties
	Cardelino, Natalia	Dr. M. Vandamme (ENPC) Dr. K. Kurtis (GT)	Multi-scale approach to creep in concrete: modeling long-term performance based upon micro-indentation
	Heindl, Helen	Dr. J.-M. Pereira (ENPC) Dr. D. Frost (GT)	Engineered Geothermal Transition Zones for Enhanced Geotechnical Foundation Systems
	Smith, Josh	Dr. A Pouya (ENPC) Dr. L. Germanovich (GT)	Reaction-induced fracture propagation during serpentine vein growth
	Yi, Andrew	Dr. A Pouya (ENPC) Dr. C. Arson (GT)	Numerical modeling of damage effects on the behavior of underground cavities in rock salt
2017	Mallett, Seth	Dr. J.-M. Pereira (ENPC) Dr. D. Frost (GT)	Computational modeling of root pullout tests
	Roozbahani, Mahdi	Dr. J.-M. Pereira (ENPC) Dr. D. Frost (GT)	Computational modeling of ant excavation
	Smith, Scott	Dr. M. Vandamme (ENPC) Dr. K. Kurtis (GT)	Poromechanical model of freeze and thaw of water in air-entrained cement pastes
2018	Atalay, Fikret	Dr. J.-M. Pereira (ENPC) Dr. D. Frost (GT)	Design of engineered transition zones to increase the performance of a heat exchanger piles – a reduced scale experiment
	Emmenegger, Leo	Dr. V. Baroghel-Bouny (ENPC) Dr. L. Stewart (GT) & Dr. K. Kurtis (GT)	Micro-structure-based concrete durability model for bridge safety
	Luettich, Lynnae	Dr. L. Brochard (ENPC) Dr. S. Burns (GT)	Stormwater BMP Design Revisions Considering the Interface of Geotechnical and Water Characteristics
	Sianta, Nicholas	Dr. J.-M. Pereira (ENPC) Dr. D. Frost (GT)	Design of engineered transition zones to increase the performance of a heat exchanger piles – a reduced scale experiment
	Wirth, Xenia	Dr. L. Brochard (ENPC) Dr. S. Burns (GT)	Beneficial Use of Biomass and Weathered Coal Fly Ashes for Adsorption of Heavy Metals from Wastewater

Year	Last, First Name	Advisors	Topic
2019	Espinoza, Wilson	Dr. J.-M. Pereira (ENPC) Dr. S. Dai (GT)	Simulation of instrumented indentation on granite subjected to temperature changes
	Flores, Noel	Dr. A. Lebée (ENPC) Dr. L. Stewart (GT)	Numerical modeling of the response of Cross Laminated Timber to explosive loads
	Tyndale, Sean	Dr. L. Brochard (ENPC) Dr. S. Burns (GT)	Relation between fly ash surficial parameters and conductivity
	Warren, Maria	Dr. A. Ehrlacher (ENPC) Mr. D. Weisz-Patrault (X) Dr. L. Stewart (GT)	Brittle Fracture of Steel Bolts under Impulsive Loading
	Yamamoto, Karie	Dr. J.-M. Pereira (ENPC) Dr. D. Frost (GT)	Computational modeling of ant excavation