Henri-Louis Girard

Physicochemical interface engineering for biology

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EXPERIENCE

Massachusetts Institute of Technology, Cambridge, MA **2015 to present**
Ph.D. Candidate, Graduate Student Researcher

- Conducted experimental research and modeling on adhesion, adsorption and transport phenomena at liquid-liquid and liquid-solid interfaces including asphaltenes, proteins, platelets, and ice with applications in anti-fouling in industrial systems, protein crystallization for low-cost vaccine manufacturing and icing mitigation for exposed surfaces.
- Supervised multiple undergraduate and graduate students in the conduct of their own research projects.
- Collaborated with research groups within and out of MIT to share expertise across fields.
- Used diverse analytical techniques (polarized microscopy, gel electrophoresis, UV-Vis, AFM Force spectroscopy) to study interfacial behavior.
- Developed data analysis tools using standard Python data science and image processing packages
- Released two open source python packages: xptools and simplabel (available on PyPI and Github)

University of California, Los Angeles, CA **2013-2015**

Graduate Student Researcher

- Derived a mathematical model to couple ion transport and electrochemical reaction in porous electrodes.
- Implemented finite element modeling of pseudocapacitors under operational and testing conditions.
- Provided design guidelines using a combination of experimental and numerical results.

French Navy (France and West Africa) **2010 to 2011**
Officer of the deck

- Assumed a position as second lieutenant on a French warship of 250 men.
- Direct representative of the captain and responsible for the conduct of the ship's operations during my watch.
- Conducted a team of up to 25 men and women to ensure safe conduct of the ship's navigation and operations.

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA **2015 to present**
Ph.D. in Mechanical Engineering (5.00/5 GPA)
Dissertation: "Interactions at interfaces across scales: from adsorption to adhesion" with Pr. Kripa Varanasi.

University of California, Los Angeles, CA **2013-2015**
M.Sc. in Aerospace Engineering (4.00/4 GPA)
Thesis: "Interfacial and transport phenomena in hybrid pseudocapacitors" with Pr. Laurent Pilon.

École polytechnique, Paris, France **2010-2013**
Diplome d'Ingenieur in Mechanical Engineering (3.84/4 GPA)

SKILLS

Science and Engineering

- Experiment design from exploratory investigation to gathering statistically significant data
- Imaging and life science techniques: SEM, Fluorescence microscopy, Spectroscopy, Ellipsometry, Electrophoresis…
- Microelectronics: sensors, actuators, serial and wireless interfacing

Computer Science

- Python
  - Data analysis, image processing, and plotting (scikit-image, pandas, numpy, plotly)
  - Machine learning: conventional and neural networks (scikit-learn, keras)
- Java: some Android development
- Source Control: Github
- Linux: general configuration, basic server setup, use of clusters

Languages

English (Fluent), French (Fluent), German (Intermediate)