

Henri-Louis Girard

PH.D. MECHANICAL ENGINEERING · INTERFACIAL SCIENCES · BIOMATERIALS · DATA SCIENCE

Somerville, MA

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🏠 hlgirard.github.io | 🎓 Henri-Louis Girard | 🌐 hlgirard | 📺 hlgirard

Skills

Data Analysis and Programing

- Python: autoprotocol, numpy, pandas, matplotlib, plotly, scikit-image, openCV, tensorflow, scikit-learn.
 - Image processing: adaptive equalization, morphological transforms, and watershed segmentation for detection of bubbles and crystals.
 - Machine learning: image classifiers for crystal detection including support vector machines, and convolutional neural networks.
 - Data analysis: automated data processing for biological assays including control verification, statistical analysis, and normalization.
- COMSOL / MATLAB: finite element simulation of electrochemical processes and electric field distribution.
- Java / SQL: developed Plant Whisperer, an Android app to track house plants soil moisture.

Experimental Sciences

- Imaging and life science techniques: scanning electron microscopy (SEM), dynamic light scattering (DLS), fluorescence and polarized microscopy, UV-Vis and fluorescence spectroscopy, gel electrophoresis, quantitative polymerase chain reaction (qPCR).
- Adhesion and adsorption characterization: atomic force microscopy (AFM), force spectroscopy, quartz crystal microbalance (QCM), X-ray spectroscopy (XPS), ellispometry, zeta potential measurement.
- Microelectronics: moisture and light sensors, servo and motor actuators, scientific instrument interfacing (I2C, GPIB, RS232).
- Lab and industrial automation: automated liquid handling, robotic workcell design, task scheduling for biological processes.

Experience

Ginkgo Bioworks

Boston, MA

AUTOMATION ENGINEER

Dec. 2019 - Present

- Scaled up synthetic biology workflows for genetic engineering processes, strain cultivation and assays by leveraging automation.
- Developed a high throughput pDNA quantification pipeline by qPCR capable of processing 1,000s of samples per day.
- Implemented a data analysis and normalization tool enabling quantitative comparison of nucleic acid titers across fermentation campaigns.

Massachusetts Institute of Technology

Cambridge, MA

PH.D. CANDIDATE, GRADUATE STUDENT RESEARCHER

Sep. 2015 - Oct. 2019

- 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 and protein crystallization for low-cost vaccine manufacturing.
- Collaborated with other research groups across fields including Pr. Mehmet Toner at MGH and Pr. Chris Love at the Koch Institute.
- Released 2 open source python packages: xptools and simplabel.
- Published 6 peer-reviewed articles and 3 patent application.

University of California, Los Angeles

Los Angeles, CA

GRADUATE STUDENT RESEARCHER

Sep. 2013 - Jun. 2015

- Derived a mathematical model to couple ion transport and electrochemical reactions in porous electrodes.
- Implemented finite element modeling of pseudocapacitors under operational and testing (three electrodes) conditions.
- Provided design guidelines on the geometry of MnO₂ pseudocapacitive electrodes to avoid Li starvation issues.
- Published 4 peer-reviewed articles in The Journal of Physical Chemistry C, Electrochimica Acta and the Journal of the Electrochemical Society.

Education

Massachusetts Institute of Technology

Cambridge, MA

PH.D. IN MECHANICAL ENGINEERING (5.00/5 GPA)

Sep 2015 - Oct 2019

“Interactions at interfaces across scales: from adsorption to adhesion” with Pr. Kripa Varanasi.

University of California, Los Angeles

Los Angeles, CA

M.SC. IN AEROSPACE ENGINEERING (4.00/4 GPA)

Sep 2013 - Jun 2015

“Interfacial and transport phenomena in hybrid pseudocapacitors” with Pr. Laurent Pilon.

École polytechnique

Paris, France

Diplome d'Ingénieur IN MECHANICAL ENGINEERING (3.84/4 GPA)

Sep 2010 - Jun 2013