

# Yousef H. El-Laham

✉ New York, NY • 📞 401-286-9373 • ✉ yousef.h.ellaham@gmail.com  
🌐 <https://yousef-ellaham.com> • 🌐 <https://github.com/yellaham>

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## Education

**Stony Brook University** **Stony Brook, NY**  
Ph.D., Electrical Engineering 08/2017 - present

- **GPA:** 3.98/4.00
- **Research Areas:** Machine learning for complex systems, Bayesian statistics, Monte Carlo methods, deep learning, reinforcement learning, stochastic optimization
- **Coursework:** Stochastic Systems, Detection and Estimation Theory, Digital Signal Processing, Bayesian Data Analysis and Computation, Machine Learning, Convex Optimization, Stochastic Models, Stochastic Calculus, Quantitative Risk Management
- **Thesis Title:** "Bayesian Learning for Complex Systems under Model Uncertainty"

**Stony Brook University** **Stony Brook, NY**  
B.E., Electrical Engineering, Honors 08/2013 - 05/2017

- **GPA:** 3.94/4.00, *Summa Cum Laude*
- **Thesis Title:** "A K-Means Clustering Approach to Adaptive Importance Sampling"

## Research Experience

**Stony Brook University** **Stony Brook, NY**  
**Principal Investigator:** Dr. Mónica Bugallo 12/2016 - present

- Focusing on addressing the challenges of Bayesian inference for complex systems
- **Active Projects:**
  1. Uncertainty quantification in deep learning models using Monte Carlo methods
    - Developing novel Bayesian deep learning approaches inspired by importance sampling for out-of-distribution data detection and active learning
  2. Bayesian learning for penguin population dynamics
    - Markov chain Monte Carlo simulations for parameter estimation in regime-switching state-space models for ecological systems with missing data
  3. Causal discovery in network data using Gibbs sampling
    - Bayesian inference of network topology in a vector autoregressive model with applications in finance and genetics

## Scholarships and Awards

- Junior Researcher Award – Institute for Advance Computational Sciences (2019-2021)
- NSF EUSIPCO Student Travel Grant (2019)
- ICASSP Best Student Paper Award (2019)
- IEEE Signal Processing Society Travel Scholarship (2019)
- Undergraduate Researcher of the Month (2017)
- Eta Kappa Nu Honor Society (2016-2017)
- Sigma Pi Sigma Honor Society (2016-2017)

## Software Skills

Python, MATLAB, R, C/C++, Pytorch, Tensorflow, Git/GitHub, SQL, VHDL, Assembly

## Preprints and Publications

- **Y. El-Laham**, L. Yang, H. J. Lynch, P. M. Djurić, and M. F. Bugallo, "Particle Gibbs sampling for regime-switching state-space models." (*Under review in 2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*)
- Z. Stuart, **Y. El-Laham**, and M. F. Bugallo, "Robust frequency and phase estimation for three-phase power systems using a bank of Kalman filters." (*Under review in 2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*)
- **Y. El-Laham** and M. F. Bugallo, "Weighted deep ensembles for classification under architecture uncertainty." in *2020 International Conference on Machine Learning (ICML)*. Affinity Group Poster Session. 2020.
- **Y. El-Laham** and M. F. Bugallo, "Policy gradient importance sampling for Bayesian inference," (*Under review for publication in IEEE Transactions on Signal Processing*)
- **Y. El-Laham**, L. Yang, P. M. Djurić, and M. F. Bugallo, "Particle filtering under general regime switching." in *2020 28th European Signal Processing Conference (EUSIPCO)*. 2020.
- **Y. El-Laham**, P. M. Djurić, and M. F. Bugallo, "Enhanced mixture population Monte Carlo via stochastic optimization and Markov chain Monte Carlo sampling." in *2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. 2020.

- M. Iloska, **Y. El-Laham**, and M. F. Bugallo, "A particle Gibbs sampling approach to topology inference in gene regulatory networks." in *2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. 2020.
- L. Yang, H. Wang, **Y. El-Laham**, et. al., "Indoor altitude estimation of unmanned aerial vehicles using a bank of Kalman filters." in *2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. 2020.
- **Y. El-Laham** and M. F. Bugallo, "Stochastic gradient population Monte Carlo," *IEEE Signal Processing Letters*, vol. 27, pp. 46-50, 2020.
- **Y. El-Laham**, V. Elvira, and M. F. Bugallo, "Recursive shrinkage covariance learning in adaptive importance sampling," in *2019 IEEE 9th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*. 2019.
- **Y. El-Laham**, Z. Krayem, J. Maghakian, and M. F. Bugallo, "A novel particle filter for high-dimensional systems using penalized perturbations," in *2019 27th European Signal Processing Conference (EUSIPCO)*. 2019.
- **Y. El-Laham**, L. Martino, et. al., "Efficient adaptive multiple importance sampling," in *2019 27th European Signal Processing Conference (EUSIPCO)*. 2019.
- **Y. El-Laham**, P. M. Djurić, and M. F. Bugallo, "A variational adaptive population importance sampler," in *2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. 2019. **(BEST STUDENT PAPER AWARD)**
- **Y. El-Laham**, V. Elvira, and M. F. Bugallo, "Robust covariance adaptation in adaptive importance sampling," *IEEE Signal Processing Letters*, 2018.

**Academic Service**

- Peer reviewer for the following journals/conferences: *IEEE Transactions on Signal Processing*, *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, *European Signal Processing Conference (EUSIPCO)*, *IEEE Signal Processing Letters*, *Signal Processing*, and *Digital Signal Processing*

**Teaching Experience**

- Graduate Teaching Assistant** **Stony Brook, NY**  
 Department of Electrical and Computer Engineering 08/2017 - 05/2019  
 • **Courses:** Probability Theory (Spring 2018-2019, Summer 2021), Electronics (Fall 2017)
- Instructor** **Stony Brook, NY**  
 High School Women in Science and Engineering 01/2019 - 05/2019
- Instructing an introductory electrical engineering course on circuit design to female high school students
  - Developed a curriculum that enhances problem-solving skills in an innovative way through tutorials on creating a night light and home security system
- Graduate Assistant** **Stony Brook, NY**  
 PSEG: Explorations in STEM Summer Research Program 05/2018 - 08/2018
- Mentored undergraduate students during their first summer research experience
  - Monitored the progress of each student through biweekly meetings and aided them in effectively communicating their research problems, developing research abstracts, and designing posters for the end of the summer research symposium

**Industry Experience**

- Product Design Intern** **East Greenwich, RI**  
 ON Semiconductor 05/2017 - 08/2017
- Used Cadence Virtuoso to design MOS level integrated circuits (IC).
  - Designed the IC to interface one-time programmable (OTP) memory cells for testing purposes and developed testing environments for the IC
- Digital Design Intern** **East Greenwich, RI**  
 ON Semiconductor 05/2016 - 08/2016
- Worked under the supervision of the product design manager to develop a simulation model in VHDL for a switching converter controller integrated circuit

**Workshops and Summer Schools**

- Machine Learning Summer School 2019 (London, England, UK)
- The Machine Learning Conference (MLconf) NYC 2019 (New York City, NY, USA)
- SDSC Summer Institute 2018: HPC and Data Science (San Diego, CA, USA)