

Education

- 2018–present **PhD, Physcis & Astronomy**, *University of California, Riverside.*
Machine learning and Bayesian statistics in Astrophysics.
- 2018–2019 **M.Sc, Physcis & Astronomy**, *University of California, Riverside.*
- 2013-2018 : **B.Sc in Physics** , *Sharif University of Technology, SUT.*

Skills

- Programming: **Git**, **Python**, **C**, **MPI parallel computing**, **cloud computing**, **TensorFlow**, **PyTorch**, **Bash**, **Linux**
- ML & stat **Bayesian statistics**, **Gaussian Process**, **Deep Learning (CNN, NLP)**, **Visualizing bigdata**
- Visualization: **matplotlib**, **Blender**, **Unity**

Experience:

Project leaderships:

- July 2023 – **Deep Learning**, *self-supervising (GPT-like) methods for inference.*
present Developing autoregressive language models, akin to GPT-3, to effectively capture the astrophysical parameter sensitivity present in observed data. The objective is to integrate key components like attention layers, with a specific focus on transformers, to autonomously learn the underlying correlations within the data. This technique helps uncover the underlying patterns in a low-quality data. *Publication Qezlou et. al. in prep*
- May 2023 – **Deep Learning**, *AI assisted super-resolution techniques help model the unresolved physics in the cosmological simulations.* .
present Using deep learning techniques (e.g. Generative Adversarial Networks, GAN), we model the detail physics in large cosmological simulations. The direct calculation of these rates is computationally prohibitive; therefore, deep learning techniques assist in approximating these quantities. We expect a potential order of magnitude improvement in our estimations compared to the traditional approaches. *Publication Qezlou et. al. in prep*
- Apr,2022 – **Statistical modeling**, *Enhancing Bayesian inference by combining cosmological probes.*
Jun 2023 Using a fully Bayesian approach, we achieve a tenfold improvement in parameter constraints by jointly analyzing multiple datasets while accounting for systematics and missing data. *Publication : Qezlou et. al. 2023 Github : lila*
- Jan,2020 – **Computer graphics, Gaussian Process**, *Detecting galaxy clusters in 3D maps of gas in the universe.*
Dec,2021 Leveraging image-recognition techniques, we detect progenitors of massive galaxies in large-scale 3D gas maps of the universe. Hyper-parameter optimization involves generating terabytes of simulated data. Additionally, a Gaussian Process model is being developed to infer the physical properties of these structures. *Publication : Qezlou et. al. 2021, Github LyTomo_Watershed*
- 2018 – 2019 **Python, C, MPI parallel computing**, *Fast python package for post-processing extremely large simulations,*
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Collaborating with the author, I maintain this widely used **python/C** package to generate \sim TBs of data from large simulations. I improved the scalability of the code to hundreds computational nodes through MPI parallelism. *Publication : Qezlou et. al. 2021 Github fake_spectra*

Relevant courses

- UCR **Machine Learning**, **Probabilistic model in AI**
- Coursera **Deep Learning specialization**

Mentoring Experience

- 2020–2021 **CASSI Summer research program for undergraduates at Carnegie observatory** , *Teaching Python, MPI parallel computing and visualizations to \sim 40 students.*
- 2018-2023 **UCR**, *Mentoring Undergraduate Students*, **Computational and Machine learning projects.**