Yongjin Jiang

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Summary

Data Scientist with nearly twenty years' experience in coding and modeling in the field of theoretical physics. Successfully published about 30 scientific papers and won a research leadership award. A graduate from the University of Minnesota, *Data Visualization and Analytics* Program. Proven ability in performing data visualization &analytics using Python, JavaScript, MySQL, Machine Learning, etc. A passionate fan of concepts, mathematics, and methods. A creative, critical thinker and an efficient learner in employing advanced skills to implement automation, maximize scalability and drive feasible results.

Skills

- *Databases:* MySQL, MongoDB, SQLite
- *Programming:* Python, JavaScript, Java, Excel/VBA, R, Tableau, MATLAB, Mathematica, Fortran, Jupyter Notebook
- *Machine Learning:* Logistic/Linear/kNN Regression, Decision tree, Random forest, SVM, Convolutional Neural Network (CNN), Recurrent Neural Network (RNN), Scikit-learn, TensorFlow, Keras
- *Mathematics:* Calculus, Linear Algebra, Complex Function Analysis, Group Theory, Green's function, Kernel Methods, Advanced Statistics
- *Theoretical Physics:* Statistical Mechanics, Quantum Mechanics, Electrodynamics, Quantum transport theory, Solid state theory, Topological Band theory, Monte Carlo simulation
- *Others:* git/GitHub, social data mining, web scraping, Heroku, docker, google cloud

Selected personal Projects in *Data Visualization and Analytics*

- D3 Journalism (graded A+) 2018 (link) (*Demo*)

  *Built an **interactive data visualization** tool for a series of feature stories about the health risks facing particular demographics of the United states**. Selectable features** for both axes. **d3.js** is heavily used in this app.*
- Global Earthquake Map (graded A+) 2018 (link) (*Demo*)

  ***Mapped** the **real time global earthquake** data (for past 7 days) with a dropdown for layer choice. **Leaflet.js** and **GeoJSON** data format is leveraged upon.*
- MySQL project (graded A) 2018 (link)

  *Listed **MySQL** queries for a database, a standard schema that can be used for examples in books, tutorials, articles, etc.*
- Belly button biodiversity (graded A+) 2018 (link) (*Demo*)

  *Constructed a **dashboard** for belly button biodiversity. **Plotly.js**, **d3.js, SQLAlchemy, flask,** are used. Deployed in **Heroku**.*

Selected Projects in *Condensed Matter theory* *(see my google scholar for a complete publication list)*

- Scattering Wave function approach to the quantum transport in mesoscopic system 2005 (link)
  - Key technique: ***Complex Linear Algebra; Wave component analysis; Boundary Conditions;***
  - Achievements: *Formulated **a scattering wave function approach** to study the quantum transport phenomena in **arbitrary lattice model** for mesoscopic systems. Such method is **more efficient algorithmically** than traditional Green's function approach and was later used by one of today's most popular simulation tools for quantum transport, i.e., Python Package Kwant.*
- Hofstadter-Butterfly of Twisted Graphene Bilayer 2018 (link)
  - Key technique: ***Python Programming**, **Data Analysis***
  - Achievements: ***Visualize** the superlattice of Twisted Graphene Bilayer(TGB) with the Python Package Kwant. **Calculated** the Landau levels (also named **Hofstadter-Butterfly**) of TGB with **Python simulation**.*

Honors/Awards

- Award for Distinguished publication during the 2005-2010 period in ZheJiang Province, P.R. China, 2012
- Academic leadership for young and middle-aged scientists in ZheJiang province, P.R. China, 2013

Experience

- Visiting Professor, ***Ningbo Institute of Industrial Technology (CAS), Ningbo, ZheJiang Province, China*** *2018.1-2018.5*

  RESPONSIBILITIES:
  - **Analyze the DFT dataset** obtained by the computation team and uncover the underlying physics story.
  - Follow up exciting progresses on the academic frontier and **propose new research projects**.

  KEY ACHIEVEMENTS:
  - Successfully **commanded** some group theoretical methods and **shared** the skill within the work group.
  - **Constructed an effective model** for a system with topological nodal ring using the new approach.
  - **Proposed** a project on twisted bilayer graphene and successfully **calculated** the Landau-levels (Hofstadter-Butterfly) for twisted bilayer graphene with **python** package **kwant**, which laid a solid basis for the group to work on the star material of 2018.
- Postdoc Associate & Visiting Scholar, ***National Sun Yat-Sen University, Kaohsiung, Taiwan*** *2017.9-2017.12*

  RESPONSIBILITIES:
  - Explore the application potential of topological materials in the direction of spintronics.

  KEY ACHIEVEMENTS:
  - Proved some novel symmetry relation of spin transport within a theoretical model of a Weyl semimetal.
- Postdoc Associate & Visiting Scholar, ***University of Minnesota, Minneapolis, MN*** *2015.1-2017.6*

  RESPONSIBILITIES:
  - **Study the transport property** of novel two dimensional crystals, especially thin film of black phosphorous.
  - Command *VASP* (a software for electronic band calculation) which complements the toolset of the group.
  - Follow up exciting progresses on the academic frontier and **propose research projects**.

  KEY ACHIEVEMENTS:
  - Finished two projects on transport of black phosphorous. **Predicted some novel effects** and received 40 citations.
  - Successfully **commanded and shared** within the work group some core techniques related to VASP.
  - **Proposed** several projects on the transport property of the hot material-- topological insulator.
- Faculty, ***Zhejiang Normal University, Jinhua, Zhejiang Province, China*** *2004.9-2014.12*

  RESPONSIBILITIES:
  - **Teach** the core courses for undergraduate and postgraduate students.
  - **Carry out computational and theoretical research** in condensed matter physics.

  KEY ACHIEVEMENTS:
  - Received high rating for my explanatory style in teaching.
  - Carried out a series of projects in the field of quantum transport of graphene, topological insulators, etc.
  - Published more than 20 scientific papers with more than 700 citations. Won a research leadership award.
- Postdoc researcher, ***Tsinghua University (Top 2 universities in China), Beijing*** *2002.9-2004.8*

  RESPONSIBILITIES:
  - **Explore the physical properties** of a newly discovered superconducting compound NaCoO**.**

  KEY ACHIEVEMENTS:
  - **Proposed** some mean field theories for the magnetic and superconducting properties of the strongly correlated system on triangular lattice. Through **numerical optimization, established** a phase diagram of the model.

Education/Certificates

- Data Visualization and analytics (grade A), Bootcamp, University of Minnesota *2018.8-2019.2*

  A 24-week intensive program focused on gaining technical programming skills in Excel, VBA, Python, R, JavaScript, SQL Databases, Tableau, Statistics, Big Data and Machine Learning.
- Deep Learning Specialization, Coursera online course *2018.10-2019.2*

  Learned about Convolutional networks, RNNs, LSTM, Adam, Dropout, BatchNorm, Xavier/He initialization, and more. Worked on case studies from healthcare, autonomous driving, sign language reading, music generation, and natural language processing. Mastered not only the theory, but also how it is applied in industry.
- Ph.D. in Theoretical Physics, Fudan University (Top 5 universities in China), Shanghai *2002.7*