Yongjin Jiang

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Portfolio: https://yongjinjiang.github.io/portfolio/

Personal Statement

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 an outstanding researcher award. A graduate from the University of Minnesota, *Data Visualization and Analytics* Program. Extensive research experience in quantum modeling and numerical simulation of nano-structured materials. A creative, critical thinker with a strong eagerness for learning and employing advanced skills to maximize scalability and drive feasible results. Proven ability in performing data visualization &analytics using Python/R, JavaScript, Machine Learning, and more.

Education/Certificates

- Data Visualization and analytics 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, 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), China 2002

Skills

- *Databases:* MySQL, MongoDB, SQLite
- *Programming:* Python, JavaScript, Excel/VBA, R, Tableau, MATLAB, Mathematica, Fortran
- *Theoretical Physics:* Quantum transport theory, Spin hall effect, Superconductivity, Topological Band theory
- *Mathematics and Statistics:* Calculus, Linear Algebra, Complex Functions, Partial Differential Equations, Group Theory, Numerical Optimization, Numerical Linear Algebra, Statistical Mechanics, Green's function, Kernel Methods, Monte Carlo simulation
- *Machine Learning:* Regression, CNN, RNN, TensorFlow
- *Others:* Social data mining, web scraping, git/GitHub, Heroku, Jupyter notebook

Selected Projects in two different areas

1. Data Visualization& Data Analytics

- D3 Journalism 2018 (link) (*Demo*)
  *An **interactive data visualization** tool is provided for a series of feature stories about the health risks facing particular demographics**. d3.js** is heavily used in this app.*
- Global Earthquake Map 2018 (link) (*Demo*)
  *A real time global earthquake map (for past 7 days) is shown with a dropdown for layer choice. **Leaflet.js** and **geojson** data format is leveraged upon.*
- MySQL project 2018 (link)
  ***MySQL** queries for a database, a standard schema that can be used for examples in books, tutorials, articles, etc.*
- Pandas: Heroes Of Pymoli 2018 (link) (*Demo*)
  *A typical application of **Python pandas** to do data analysis. Deployed on **binder.org** for running **Jupyter notebook**.*
- Web Scraping: Mission To Mars *2018* (link) (*Demo*)
  ***Web scraping** for real time news about Mars: Python packages like **requests, BeautifulSoup, selenium, pymongo, flask** are used. Deployed on **Heroku** (note for demo: refresh the /scrape page for a few times if somehow it stopped working).*
- *Belly button biodiversity* *2018* (link) (*Demo*)
  ***Dashboard** for plotting belly button biodiversity. **Plotly.js** and **d3.js** are used to make the visualizations. Deployed in **Heroku**.*

2. Modelling & Simulation in theoretical condensed matter physics

- Scattering Wave function approach to the quantum transport in mesoscopic system 2005 (link)

  A new scattering wave function approach *was presented for the first time to study the quantum transport phenomena in* ***arbitrary lattice model*** *for mesoscopic systems. This method can provide* ***more detailed real space data*** *than the standard non-equilibrium Green's function approach widely adopted by the community. Such method is also* ***more efficient algorithmically*** *and was later adopted by today's most popular simulation tool for quantum transport, i.e., Python Package Kwant.. Our earlier systematic paper on this method can be found here(2006).*

- Boundary-confinement-induced spin-orbit coupling 2006 (pdf)

  A new model *for spin-orbital coupling in semiconductor electron gas is proposed.* ***MATLAB simulation*** *of quantum transport for this model is performed. Some spin-hall-alike effect is* ***predicted*** *in the model. Cited 51 times.*

- Andreev conductivity of graphene with d+id' superconducting pairing 2008 (pdf)

  A special superconducting state for graphene was ***analyzed*** *and some* ***intriguing correlation*** *with other states was* ***found****. Through* ***numerical simulation*** *with* ***Fortran programming language****, we* ***predicted*** *some observable effects that can be proved or falsified by experiment. Our work is being cited continually during the past years including several times by "Review of Modern Physics", the most prestigious review journal in the physics community. Cited 50 times.*

- Generation of pure bulk valley current in graphene 2013 (pdf)

  Based on ***symmetry analysis*** *of the suspended graphene,* ***a novel effect*** *that can lead to a state with pure valley current was theoretically* ***predicted****. Using* ***MATLAB simulation****, such effect was quantitatively characterized. A pure 4-probe experimental setup was proposed to detect such a state. Published in the prestigious Journal "Physical Review Letters", Cited 135 times.*

- Magnetoelectronic properties of multilayer black phosphorus 2015 (pdf)

  Based on a ***phenomenological model*** *(proposed by us on a previous paper) for multilayer black phosphorus thin films, we used* ***MATLAB simulation*** *to calculate its ac conductivity under magnetic field.* ***A distinct structure was revealed*** *for its Landau energy levels, which is different from that of usual semiconductor electron gas as well as graphene. Cited 28 times.*

- Hofstadter-Butterfly of Twisted Graphene Bilayer 2018 (link)

  Using the Python Package Kwant, set up and ***visualize*** *the superlattice of Twisted Graphene Bilayer(TGB), research on which became the most important scientific breakthrough of the year 2018. Use* ***Python simulation*** *to calculate the Landau levels of the lattice model for TGB, which is also named* ***Hofstadter-Butterfly*** *of TGB.*

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Awards &Responsibility

- 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
- Referee for *Physical Review Letters*, *Physical Review B* and several other Physics Journals.

Job expectation

Data Scientist, Researcher or/and Engineer of Machine Learning and Deep Learning (e.g., Machine Translation, Natural Language Processing, Computer visualization).

Portfolio

- More about me can be found here.