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 an outstanding researcher award. A graduate from the University of Minnesota, *Data Visualization and Analytics* Program. Proven ability in performing data visualization &analytics using Python, Html/CSS/JavaScript, R, Tableau, Excel/VBA, MySQL/MongoDB, Machine Learning/Deep Learning, Hadoop MapReduce, Apache Spark, etc. A creative, critical thinker and an efficient learner in employing advanced skills to implement automation, maximize scalability and drive feasible results.

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, 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 (Shanghai, China) *2002.7*

Experience

- Visiting Professor, Ningbo Institute of Industrial Technology, Chinese Academy of Sciences *2018.1-2018.5*
  1. Constructed an effective model for a system with topological nodal ring using group theoretical approach.
  2. Calculated the Landau-levels (Hofstadter-Butterfly) for twisted bilayer graphene with python kwant.
- Postdoc Associate & Visiting Scholar, National Sun Yat-Sen University (Taiwan). *2017.9-2017.12*
  Exploration of spintronics application for the topological Weyl semimetal.
- Postdoc Associate & Visiting Scholar, University of Minnesota *2015.1-2017.6*
  1. Python (kwant) simulation to investigate electron transport of two dimensional crystalline material.
  2. Electronic band structure calculation based on first principle density functional theory (DFT) approach.
- Faculty, Physics department of Zhejiang Normal University (Zhejiang, China) *2004.9-2014.12*
  1. *Teaching electromagnetism, quantum mechanics, general physics, solid state theory.*
  2. *Computational and theoretical research in condensed matter physics. # published academic papers>20.*
- Postdoc researcher, Tsinghua University (Beijing, China) *2002.9-2004.8*
  Research on Magnetic and superconducting properties of strongly correlated system on triangular lattice.

Skills

- *Databases:* MySQL, MongoDB, SQLite
- *Programming:* Python, JavaScript, 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, Numerical Optimization, Numerical Linear Algebra, Green's function, Kernel Methods, Advanced Statistics
- *Theoretical Physics:* Statistical Mechanics, Quantum Mechanics, Electrodynamics, Solid State Theory, Quantum transport theory, Superconductivity, Topological Band theory, Monte Carlo simulation
- *Others:* git/GitHub, social data mining, web scraping, Heroku, docker, google cloud platform, google colab

Projects in Data Visualization and 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 of the United states**. Selectable features** for both axes. **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 **Python pandas** application in data analysis. Deployed on **binder.org** for running **Jupyter notebook** live.*
- Web Scraping: Mission To Mars 2018 (link) (*Demo*)

  ***Web scraping** for real time news about Mars. **requests, Beautiful Soup, Selenium, PyMongo, flask** are used. Deployed on **Heroku**.*
- Belly button biodiversity 2018 (link) (*Demo*)

  ***Dashboard** for plotting belly button biodiversity. **Plotly.js**, **d3.js, SQLAlchemy, flask,** are used. Deployed in **Heroku**.*
- Music generation 2019 (link) (*Demo*)

  *Using **Recursive Neural Network (RNN)** to train music input and generate new pieces of similar style, used **LSTM Network**, **Keras, TensorFlow**. Deployed in **Heroku**.*

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

Publications&e-Prints in Condensed Matter Physics

1) **Andreev reflection in a patterned graphene nanoribbon superconducting heterojunction,** with C Bai, Y Yang, H.X. Yang, *Physical Letter A* 383, 1174–1181 (2019)
2) **Topological currents in black phosphorus with broken inversion symmetry**, with T. Low and F. Guinea, *Phys. Rev. B* 92 (23), 235447(2015)
3) **Magneto-electronic properties of multilayer black phosphorus,** with R. Roldán, F. Guinea, T. Low, *Phys. Rev. B* 92,085408 (2015)
4) **Tunable optical properties of multilayer black phosphorus thin films**, with T. Low, A. S. Rodin, A. Carvalho, Han Wang, F. Xia, and A. H. Castro Neto, ***Phys. Rev. B*** 90, 075434 (2014).
5) **Standard form of the scattering matrix for time reversal symmetric system**, with X. Lu, F.Zhai, arXiv:1310.3733(2013)
6) **Generation of pure valley current in graphene**, with T. Low, K. Chang, M. I. Katsnelson, and F. Guinea, ***Phys. Rev. Lett***.110, 046601(2013)
7) **Electron pumping in graphene mechanical resonatorsElectron pumping in graphene mechanical resonators**, with Tony Low, M. I. Katsnelson, and F. Guinea, *Nano Lett.* ***12*** (2), pp 850–854(2012);
8) **Negative differential spin conductance in doped zigzag graphene nanoribbons,** with T. Wu, X.F. Wang, M.X. Zhai, H. Liu, L.P. Zhou, *Appl. Phys. Lett.* 100, 052112(2012);
9) **s-wave superconductivity with orbital-dependent sign change in checkerboard model of iron-based superconductors**, with X. Lu, C. Fang, W. F. Tsai, J. P. Hu, *Phys. Rev.B.85*,054505(2012).
10) **Connectivity of edge and surface states in topological insulators,** with F. Lu, F. Zhai, T. Low, J.P. Hu, *Phys. Rev.B.84*, 205324 (2011);
11) **Size effects on topological Anderson insulator**, with W. Li, J.D. Zhang, *Phys. Rev. B. 84*, 033409 (2011);
12) **Structural and magnetic instability of bilayer and trilayer graphene nanoribbons**, with Y. Zhang, X.L. Lu, B. Teng, J.Q. Lu, *J.Comput.Theor.Nanosci*.8,2448(2011)
13) **Andreev conductance in the d+id' superconducting states of graphene**, with D.X. Yao, E. W. Carlson, H.D. Chen J.P. Hu, *Phys.Rev.B.*77, 235420(2008)
14) **Some symmetry properties of spin currents and spin polarizations in multi-terminal mesoscopic spin-orbit coupled systems,** with L.B. Hu, *Phys. Rev. B 75*, 195343 (2007)
15) **Nonequilibrium spin polarization effects in a spin-orbit coupling system and contacting metallic leads**, *Phys. Rev. B* 74, 195308 (2006);
16) **Kinetic magnetoelectric effect in a two-dimensional semiconductor strip due to boundary-confinement-induced spin-orbit coupling**, with L.B. Hu, *Phys. Rev. B* 74, 075302(2006)
17) **Magnetic phases of t-J model on triangular lattice**, with F. Yang and T. Li, cond-mat/0405164(2004)
18) **Spin Dynamics of t-J Model on Triangular Lattice**, with T. Li, cond-mat/0309275(2003)
19) **Vortex and Magnetoresistance in Nanomagnet**, with H.J. Li and R.B. Tao, *Phys. Lett. A* 298,410(2002)
20) **Evidence of stripe formation tendency in t-J model**, with D. S. Deng, and R.B. Tao, *Physica C* 377,85(2002)
21) **Spinless excitation implicit in SO(5) theory**, with R. B. Tao, *Commun. Theor. Phys.* 36(2001)623