**Bo Cai**

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**QUALIFICATIONS:**

* PhD with broad range knowledge of computer science, statistics, finance and math.
* Full stack developer with over 10 years total IT experience. Fast adapter to new technologies.
* Leadership of coordinating work between business, team members and other teams.
* Ability to solve sophisticated problems with limited time and resources.
* Ability to provide technical guidance to less experienced peers.
* Can be relied on to meet deadlines with high quality deliverables.
* Bilingual abilities (English/Chinese).

**TECHNICAL SKILLS:**

* 8 years **Python** experience. Project related libraries include **Pandas**, **NumPy**, **SciPy**, **Scikit-learn**, **Django**, **Flask**, **Multiprocessing** and **Beautiful Soup**.
* 10+ years **C/C++** experience. Project related libraries include **STL**, **Boost**, POSIX threading and socket programming.
* 4+ years hands-on experience in large-scale **KDB** tick plant infrastructure and **Mongo DB** development.
* 4+ years web development experience. Fluent in **Angular JS**, **React JS**, **jQuery**, **HTML5**, **Bootstrap** and **CSS3**.
* 4+ years hands-on experience in machine learning development. Fluent in Sci-kit learn, TensorFlow and CUDA. Project related algorithms include KNN, SVM, RF, GMM, HMM.
* Hands on experience with popular third party analytic libraries such as **AWS**, **Bloomberg API**, PULP, CBC and Google analytics library.

**PROFESSIONAL EXPERIENCE:**

**Senior Quant Developer at UBS Oct 2017 - Present**

* Single handedly developed portfolio management tool for UBS fixed-income emerging market team. The web-based tool helps UBS traders to make trading decisions by confining portfolios to certain risk or performance criteria. The tool utilized IBM COIN-CBC solver to solve large-scale linear programing (LP) and mixed integer programing (MIP) problems to decide which securities to buy or sell. More than twenty models were programed into the tool based on trader’s experience. Backend technologies utilized for this project include Django, Django-Restful-API, Pandas, NumPy, SciPy, Pulp, CBC and Bloomberg API. Front-end technologies utilized for this project include AngularJS, jQuery, Bootstrap, HTML5 and CSS3.

**Senior Quant Developer at BNP Paribas**  **Aug 2016 - Oct 2017**

* Maintained and developed BNP in-house fixed-income analytics library (Westminster).
* Designed and developed BNP fixed-income custom indices (BNIFELE0, BNIFJLY0) tool. BNP had over 5-billion-dollar positions in these custom indices. The tool collected clean-price, dirty-price, coupon rate, maturity date, CPI rate, duration, KRD and DTS from BNP internal database. It calculated USD hedged indices values based on Westminster libraries **or** third-party librar**ies** (Bloomberg API)**. I**t then sent e-verified indices values to Reuters and Bloomberg at end of day (around **5**PM EST).
* Migrated over 20 front desk VBA applications to python. These day-to-day tasks include risk management, scenario risk listing, derivative pricing, hedging scenarios P&L, daily portfolio position etc.

**Quant Developer at SEC QAU July 2015 - Aug 2016**

* Participated in developing National Examination Tool (NEAT). The tool helped SEC examiner to identify trading violations such as cross-trade, Rule 105 violation, insider trading, spoofing trade etc. More than 20 models/algorithms were programed to into the tool by either Python code or KDB/Q code. The front-end for this project utilized Agular-JS, D3, high-chart. The back-end for this project utilized Django, Pandas, Python C++ and KDB+.
* Developed spoofing detecting algorithm by implementing Gaussian Mixture Model(GMM) and Hidden Markov Model(HMM) to identify spoofing activities in large-scale time-series data set.
* Assisting SEC Examiner with large-scale time-series data analysis (>20GB) on hedge-fund examinations (Two Sigma, AQR and KCG). Developed in-house python-KDB tick plant platform and machine learning algorithm to identify trading violations.

**Co-founder/Lead Developer at Dealfar LLC Aug 2014 - July 2015**

* Startup focused on developing web-based e-trading and risk management platform for traders and strategist in tri-state area to support them day-to-day research, simulation and signal generating task. Projects heavily utilized Angular-JS, Django, KDB, AWS and Bloomberg API.

**Software Developer at CUNY Research Foundation Sep 2007 - Aug 2014**

* Developed in-house semiconductor characterization system for research group. The system was developed in C++ with low-level Keithley C++ API in Linux environment. Upon running, millions of data points were collected by Keithley high-precision instruments and stored in 32bit KDB database. After that, Semiconductor carrier type, carrier density, carrier mobility and Hall coefficient were studied by first-principle model.
* Designed and developed Transmission Electron Microscopy (TEM) diffraction pattern simulation software. The tool utilized semiconductor crystal structure data collected by TEM image system. Image processing and machine algorithm were used to study crystal defects, energy level and semiconductor type. The system was developed with C++ and Python in Linux environment.

**EDUCATION:**

* **The Graduate Center of City University of New York** New York, NY

**Ph.D.** Computational Material Science (GPA 3.9/4.0) 2014

* **Chinese Academy of Science** Shanghai, China

**M.S.** Computer Science (GPA 3.9/4.0) 2007

* **Peking University**, Beijing, China

**B.S.** Physics (GPA 3.8/4.0) 2005

**AWARDS/HONORS:**

* PSC-CUNY doctoral student research grant 2011,2013
* Full Scholarship CUNY-Graduate Center 2007-2014
* Invited Talk – Material Research Society Fall Meeting 2013
* 1st Place Gold Medal Prize. National Math Olympiad Contest, China 2000
* 1st Place Gold Medal Prize. National Physics Olympiad Contest, China 2000
* 1st Place Gold Medal Prize. The 5th National Junior Math Contest, China 1995

**THEORETICAL PUBLICATIONS:**

* Cai, B., M.L. Nakarmi, B.S. Franks and R.C. Rai. "*Electro-optical Effects and Temperature-dependent Electrical Properties of LuFe2O4 Thin Films.*" Thin Solid Films 562: 490-94. 2014
* Cai, B., M.L. Nakarmi, T.N. Oder, M. McMaster, N. Velpukonda and A. Smith. "*Elevated Temperature Dependent Transport Properties of Phosphorus and Arsenic Doped Zinc Oxide Thin Films*." Journal of Applied Physics 114: 223709. 2014
* Oder, T. N., A. Smith, M. Freeman, M. McMaster, B. Cai and M. L. Nakarami. "*Properties of ZnO Thin Films Co-doped with Lithium and Phosphorus*." Journal of Electronic Materials. Online first in March issue. DOI: 10.1007/s11664-014-3074-9. 2014
* Oder, T.N., A. Smith, M. Freeman, M. McMaster, B. Cai and M.L. Nakarmi. "*Properties of Sputter Deposited ZnO Films Co-doped with Lithium and Phosphorus*." Materials Research Society Symposium Proceedings 1494: Z04-48. 2013
* Nakarmi, M.L., B. Cai, J.Y. Lin and H.X. Jiang. "*Three-step Growth Method for High-quality AlN Epilayers*." Physica Status Solidi A 209: 126-29. 2012
* Rai, R.C., A. Delmont, A. Sprow, B. Cai and M.L. Nakarmi. "*Spin-Charge-Orbital Coupling in Multiferroic LuFe2O4 Thin Films*." Applied Physics Letters 100: 212904. 2012
* Rai, R.C., M. Guminia, S. Wilser, B. Cai and M.L. Nakarmi. "*Elevated Temperature Dependence of Energy Band Gap of ZnO Thin Films Grown by E-Beam Deposition*." Journal of Applied Physics 111: 073511. 2012
* Rai, R.C., S. Wilser, M. Guminiak, B. Cai and M.L. Nakarmi. "*Optical and Electronic Properties of NiFe2O4 and CoFe2O4 Thin Films.*" Applied Physics A 104. 2011
* Cai, Bo and Mim L. Nakarmi. "*TEM Analysis of Microstructures of AlN/Sapphire Grown by MOCVD*." Materials Research Society Symposium Proceedings 1202: I05. 2010

**VISA STATUS:** Green Card