**Bo Cai**

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**QUALIFICATIONS:**

* PhD with broad range knowledge of computer science, quantitative analysis and financial products.
* 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 libraries.
* 2 years hands-on **KDB** experience on large-scale **tick plant infrastructure**.
* Strong front-end development skills. Fluent with cutting-edge JavaScript libraries such as **Angular JS**, **React JS**, **Vue JS**, **jQuery**, **HTML5**, **Bootstrap** and **CSS3**.
* 2 years hands-on **machine learning** experience. Project related algorithms include KNN, SVM, RF, GMM, HMM.
* Hands on experience with popular third party analytic libraries such as **AWS**, **Bloomberg API**, IBM CPLEX 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 their portfolios to certain risk or performance criteria. The tool utilized IBM COIN-CBC library to solve large-scale linear programing (LP) and mixed integer programing (MIP) problems to decide which securities to buy or sell. More than twenty different 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, Scikit-learn and Bloomberg API. Front-end technologies utilized for this project include Angular-JS, 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 e-trading and risk management platform for hedge funds in tri-state area. Delivered web-based trading tools for traders or strategists to support their day-to-day analyzing and simulation task. This work utilized Angular-JS, Django, KDB, AWS, Bloomberg API and other third-party libraries.

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

* Developed in-house semiconductor characterization system for research group. The system utilized low-level Keithley C++ API to connect Linux machine to multiple Keithley instruments via GPIB protocol. Upon running, the system will collect millions of temperature and pressure dependent data to calculate semiconductor carrier type, carrier density, carrier mobility and Hall coefficient. The system utilized in-memory database for high performance and low latency. System was developed with C++ and Python in Linux environment.
* Designed and developed Transmission Electron Microscopy (TEM) diffraction pattern simulation software. The tool can be used to determine semiconductor crystal structure by analyzing image data collected by TEM diffraction pattern. The underlying theory used for simulation is Bloch wave method. 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 3.9/4.00) 2007

* **Peking University**, Beijing, China

**B.S.** Physics (GPA 3.8/4.00) 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