Bo Cai

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**QUALIFICATIONS:**

* PhD with broad range knowledge of computer science, quantitative analysis, statistics and math.
* Full stack developer with over 10 years total IT experience. Hands-on experiences with full life-cycle large scale analytic platform development for top tier investment bank and financial institution.
* 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), fast learner.

TECHNICAL SKILLS:

* 6+ years **Python** development experience. Project related library includes **Pandas**, **NumPy**, **SciPy**, **Scikit-learn**, **Django**, **Flask**, **Multiprocessing** and **Beautiful soup**.
* 8+ years **C/C++** programing experience. Used libraries includes: **STL**, **Boost**, POSIX threading and socket library.
* 4+ years hands-on experience with **KDB+** on large-scale **tick plant infrastructure**.
* 3+ years hands on experience with JavaScript development. Project library includes: Angular JS, React JS, jQuery, HTML5, CSS3.
* In-depth **machine learning** knowledge. Project related algorithm includes KNN, SVM, RF, GMM, HMM.
* Hands on experience with third party analytic libraries including: Amazon AWS, Bloomberg API, IBM CPLEX, , COINC-CBC and Google optimization tool etc.

PROFESSIONAL EXPERIENCE:

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

* Single handedly designed and developed portfolio optimization tool for UBS fixed-income emerging market desk. The tool utilized Django-Restful-API, Angular-JS and Python Django framework. Other libraries used includes Pandas, NumPy, SciPy, Bloomberg API and COIN-CBC. This tool helps UBS traders to make decisions by quantitatively solving large-scale Linear Programing (LP) and Mixed Integer Programing (MIP) problems. More than twenty models were programed into the tool based on trader’s experience. The backend database for this project is KDB+ in Linux enviroment.

Senior Quant Developer at BNP Paribas Aug 2016 – Oct 2017

* Maintain and developed BNP fixed-income analytic library (Westminster).
* Designed and Developed BNP fixed-income custom indices (BNIFELE0, BNIFJLY0) publication tool. BNP has over 5-billion-dollar position in these custom indices. The application automatically gets clean price for over thousand bonds in Japan, UK, EU and US markets at the end of day (around 5PM EST). It then calculates USD hedged indices value based on dirty-party analytic libraries (Bloomberg API), It also automatically downloaded coupon rate, CPI rate, maturity date, bond duration, KRD and DTS values from internal database (Oracle DB). Finally, it verifies the indices value through E-verify and then publish the value to Reuters and Bloomberg at around 6PM EST each day.
* Migrated over 50 front-desk VBA applications into python. These day-to-day jobs include risk management, scenarios risk listing, fix-income derivative pricing, hedging scenarios P&L, daily portfolio position etc.

Quant Developer at SEC Quantitative Analysis Unit (QAU) July 2015 –Aug 2016

* Participate in developing National Examination Tool (NEAT) for SEC examiner. The architechre of this platform Angular JS, Python Django and KDB+ to identify trading violations such as cross trade, Rule 105, insider trading. More than 20 models/algorithms were programed to KDB/Q functions and then called from Agular-JS front-end. This project utilizes JavaScript as front end, Python as intermediate layer and C++/KDB backend.
* Developed spoofing detecting algorithm by implementing Gaussian Mixture Model(GMM) and Hidden Markov Model(HMM) to identify spoofing activities in high frequency trading.
* Assisting SEC Examiner with large-scale time-series data analysis (>20GB) on examinations (such as 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 or analysis 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 2009 - 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 or pressure dependent data points to analyze semiconductor carrier type, carrier density, carrier mobility and carrier Hall coefficient. The system utilized in-memory database for high performance. 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. The underlying theory is Bloch wave method. The system was developed in Python, NumPy and Scikit-learn 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) 2009

* **Peking University**, Beijing, China

**B.S.** Physics (GPA 3.8/4.00) 2007

AWARDS/HONORS:

* PSC-CUNY doctoral student research grant 2011, 2013
* Full Scholarship CUNY-Graduate Center 2009 – 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