CHARLES PLAGER

OVERVIEW

Accomplished quantitative developer with an established track record of collaboration, mentoring, and building and maintaining complex systems. Experienced practitioner of Python, C#, C++, git, and more.

EDUCATION

Ph.D. Physics, University of Illinois, Urbana-Champaign   2003
- Thesis: *A Search for CP Violation in, and a Dalitz Analysis of, $D^0 \rightarrow \pi^-\pi^+\pi^0$ in CLEO II.V*

M.S. Physics, University of Illinois, Urbana-Champaign

B.S. Math, Physics, and Psychology, University of Illinois, Urbana-Champaign

PROFESSIONAL EXPERIENCE

Senior Quantitative Developer   Sept 2015 – Present
Ellington Management Group

- Designed and built multiple equity and futures execution systems, written in Python, C#, and C++ using ZMQ for inter-process communication. Capable of trading in fully automated fashion as well as human initiated trades with durations ranging from minutes to all day. The strategy used the C++ engine to back-test or trade using historic data or live data.
- Created live updating web pages using live L1 and L2 equity data and bond/CDS prices to give traders suggested bond/CDS trades the ability to manage in-situ equity hedge.
- Designed and built futures and equities live L1 and L2 data capture system (in C++ and C#). Data is streamed from multiple sources, available to live processes as individual L1 and L2 tick data and as aggregated minute bars. Data streaming system able to play back saved data for testing purposes.
- Worked to standardize python environments company-wide, including providing a standard set of basic utilities. Created web framework using flask, plotly, and dash for easily converting Jupyter notebooks into interactive web pages. Able to perform live updating dashboards.
- Built FIX engines in C# for two directional communications (both STP/drop copy and trading). Analyzed our trade executions, market data to improve our executions.

Associate – Intraday Researcher   Jun 2014 – Sept 2015
AQR Capital Management

- Built infrastructure to create intraday cumulative return series using python and pandas. These series include information about corroboration of data between multiple data sources, filtering bad historic prices using daily high/low prices, as well as having removed block and spread trades in outright markets.
- Studied futures and FX volumes using pandas. Created intraday predictive models as well as investigated our trading volumes comparing to total exchange volumes, looking to understand constraints on our trading.
- Investigated sided flow imbalance (both as self-determined and as marked by the exchanges) using pandas. The imbalance information is used as both a source of alpha as well as the basis to create trading cost models.

Quantitative Research Analyst/Senior Developer   May 2011 – Jun 2014
Graham Capital Management

- Redesigned and implemented new futures smart execution engine using C++ dynamic programming. Enabled easy innovation with new cost models and is designed to allow a single "pool" of orders with different types of algorithms. Built real-time web monitoring of live executions able to investigate current performance as well as diagnose any issues.
- Created FX cash trading cost model using market conditions for vetting trading systems using Python, incorporating effects such as size and time of day into account. Designed corrections to use Graham's actual execution performance to cost model.
- Built database of all systematic execution. Performed extensive analysis using Python, R, and Root frameworks. Created framework allowing all available processing cores to be used simultaneously, producing results orders of magnitude faster as well as recovering from infrastructure failure rates as high as 5%.

COMPUTER SKILLS

Languages: Strong knowledge of Python, C#, C++. Current usage of SQL. Past experience with C, R, Perl, AHDL, OneTick, Fortran, Mathematica.
Platforms: UNIX, Linux, Microsoft Windows (including WSL2 and Cygwin), MacOS.
Version control: Strong knowledge of git. Experience with CVS, SVN, TFS, perforce.
Web: Extensive use of Flask in python and past use of CGI interfaces using both Python and Perl.

AWARDS

2008 URA Visiting Scholars Fellowship.
2002 Giulio Ascoli Award for Demonstrating Excellence and Originality in the Study of High Energy Physics.
    Scott Anderson Physics Assistant Award for Excellence in Teaching.

VOLUNTEER EXPERIENCE

Peace Corps
Physics Van Outreach Program
Crisis Line Volunteer

ACADEMIC EXPERIENCE

Staff Physicist/Guest Scientist
UCLA and **Fermi National Accelerator Laboratory**   **CMS** and **CDF Collaborations**

- Architect of novel top cross section measurement technique, published in PRD (2011).
- Assembled team of over ten physicists on CMS which lead to world's most accurate single measurement of top cross section, leading to two publications (Phys. Rev. D (2011) and Physical Letters B (2013)). Expanded technique to work as data-driven estimate of backgrounds for searches with similar signatures as top (*e.g.,* SUSY, Higgs, single top, and other exotic phenomena).
- Appointed Physics Analysis Support Convener at LPC in January 2010 providing both statistical and analysis implementation support to LPC personnel.
- Repurposed several CDF analysis tools for CMS as well as created new ones. Includes, for example, python interface to CMS data format, good run list scripts, pileup estimation machinery, and several statistical tools.

Postdoctoral Research Associate
University of California, Los Angeles (UCLA)   **CDF Collaboration**

- Appointed co-convener of top quark properties group in January 2007 - August 2008; tasks include reviewing the analyses and working to standardize analysis tools and procedures.
- Founded and lead a ten-person analysis group searching for top quark flavor changing neutral currents (*e.g.,* $t \rightarrow Zc$; 1.9 fb^{-1}), published in PRL.
- Performed analyses on various top quark properties. Top quark branching fraction analysis (200 pb^{-1}), single top cross section combination (2.2 fb^{-1}). combining the two CDF (dilepton) top quark pair cross section analyses for the Run II Tevatron's first high p_T publication.
- Supervised graduate and undergraduate students on both analyses and service projects. Created top physics analysis framework letting users analyze data outside the CDF software environment. Updated the online data monitoring interface using a web interface allowing "remote shifts". Authored new web-based system *WebTalks* for organizing talks allowing easy access by both speakers and participants.

Research Assistant
University of Illinois   **CLEO Collaboration**

- Performed a complete Dalitz plot analysis examining the resonant substructure of $D^0 \rightarrow \pi^- \pi^+ \pi^0$ decays.
- Deeply involved in design, simulation, construction, documentation, and maintenance of trigger electronics and software for CLEO III detector. Created computer simulations and pattern generation of tracking trigger. Designed, tested, and laid out Stereo Trigger (STTR) boards. Wrote code for debugging trigger boards in VME crates. Served as *Trigger Czar* (responsible local on-call expert for trigger system).
- Created framework allowing seamless integration of C++ with existing FORTRAN code.

Teacher
Peace Corps, Central Africa

- University of Dschang, Cameroon, Africa: taught "Physics for Biologists" (La Physique pour Les Science Naturelles) for three semesters in French. Lecture size ranged from 120 students to 550 students.
- Lycee de Mobaye, Central African Republic, Africa: coordinated class topics from 6$^{\text{è me}}$ (7th grade) to terminale (13th grade) as head of math department. Taught 3$^{\text{è me}}$ (10th grade) through terminale in French.

Teaching Assistant
University of Illinois, Physics Department

- Physics 101-102 (General Physics): taught 2 lab sections (total of 50 students). Redesigned all 10 labs for Physics 101 and laid the groundwork for the new labs for Physics 102 with Prof. David Hertzog.
- Physics 140 (Practical Physics – How Things Work): co-designed and developed "The Discovery Room" with Prof. David Hertzog – a new hands-on approach to learning for non-science majors. Taught 8 Discovery Room sections per week (50 students).
- Physics 106 (General Physics: Mechanics): taught discussion and lab, wrote quizzes. Graded lab reports, quizzes and exams for 75 students.

CITIZENSHIP AND LANGUAGES

US Citizen   Fluent in English and French

Selected publications and talks available at
http://plager.net/CharlesPlagerSelectedPublications.pdf

LinkedIn Profile
https://www.linkedin.com/in/charlesplager/