

Antoine J. Bruguier

Cell: (415) 830-6719
Email: tony.bruguier@gmail.com
Web: <http://www.bruguier.com>

Education

California Institute of Technology

PhD, Electrical Engineering

October 2007

Thesis: Encoding of Financial Signals in the Human Brain

Advisor: Peter Bossaerts

California Institute of Technology

MS, Electrical Engineering, 4.0 GPA

June 2004

École Supérieure d'Ingénieurs en Électronique et Électrotechnique

Diplôme d'Ingénieur (MS in Electrical Engineering), valedictorian

June 2004

Research Experience

California Institute of Technology

Graduate Research Assistant

2004-2007

- Data analysis of fMRI signals acquired during neuroeconomics experiments, by integrating new statistical and signal processing methods:
 - Canonical correlation analysis
 - Hotelling's T^2 tests
 - Other multivariate methods (PCA/ICA)
 - Ridge regression
 - Deconvolution
 - Generalized cross validation
 - Denoising with wavelets
- Test validity of utility theory in the brain of subjects playing a simple gambling card game
- Aim to discover how the human brain aggregates information from stock market trading orders
- Collaborate with Columbia university on encoding of risk aversion in the brain
- Test human behavior among people with theory of mind deficit (Asperger's syndrome)
- Languages used: C++, Matlab, Unix scripts

École Supérieure d'Ingénieurs en Électronique et Électrotechnique

Undergraduate Researcher

Fall 2002

- Designed teaching program that modeled the differential equations of the oscillations in an Erbium-YAG laser
- Collaborated with the University Politehnica of Bucharest
- Language used: Matlab

Undergraduate Researcher

Spring 2002

- Digital electronics projects: designed keyboard/billboard interface
- Used VHDL to program CPLD

- Undergraduate Researcher** Spring 2000
- Collaborated to devise cipher part of a fully featured encryption program (wrote ciphers)
 - Implemented IDEA and 2048-bit RSA ciphers
 - Languages used: C++, PowerPC assembly

Teaching & Mentoring Experience

California Institute of Technology

- Mentor** 2006-present
- Guiding research project on perception by human brain of social interactions
 - Introduced SURF student various lab staff and helped with setup paperwork
 - Providing help during the data analysis process

- Teacher's Assistant** 2003-2004

Courses: Random Processes for Communication and Signal Processing
Communication Theory (a) and (b)

Instructor: Payman Arabshahi

- Provided assistance in homework and hands-on project
- Graded homework sets and exams

Self-employed

- Private tutor 2002-2003
- Provided one-on-one help to junior and senior high school students
 - Helped with homework
 - Mathematics and physics

Professional Experience

Brion (an ASML company)

- Staff design engineer (R&D)** January 2010 – present
- Improvement on resist model that has better predictive power in interpolation and extrapolation, ease of use, and speed
 - Collaboration with international team to lower metrology burden in fab environment

- Senior Engineer (R&D)** October 2007 – December 2009
- Created and implemented new model for resist process with much lower human interaction (patent applied for)
 - Research in tuning of parent company's scanners
 - Creation of measurement gauges that have better prediction power and are faster to measure

Philips Medical Systems North America

- Summer Intern** Summers 2002, 2003, and 2004
- Improved on automated EKG interpretation algorithms for cardiographs
 - Created proprietary algorithm for measurement of QRS-T loops using vectorcardiography
 - Measured effect of in-house lead transformation algorithms on diagnostic performance
 - Wrote denoising and onset/offset detection algorithms using wavelets
 - Wrote optical waveform recognition algorithms
 - Wrote EKG marking program for the rest of the team
 - Languages used: C++, C#, Basic, MATLAB, Unix scripts

OSC Solutions

Summer Intern

Summer 2001

- Setup startup company's IT infrastructure (Setup LAN, Source Control Server)
- Utilized Java/WebObjects to create prototype for Enterprise Resource Planning program
- Finalized customer management and production logistic sections
- Utilized ReportMill to generate reporting files and bills
- Languages used: Java, SQL, Unix scripts

LSV Communication

Summer Intern

Summer 1999

- Programmed a shopping cart for a real-estate advertisement website
- Developed a mailing-list database allowing customers to receive weekly and personalized updates
- Languages used: 4D, JavaScript

Publications & Posters

Antoine Bruguier, Steven Quartz, and Peter Bossaerts

"Exploring the Nature of Trader Intuition"

Journal of Finance (2010 Forthcoming)

Antoine Bruguier, Yu Cao, Luoqi Chen, Wenjin Shao

"A harmonic resist model"

US Patent – applied in 2009

Chi-Yuan Shih, Ray-Chen Peng, Yao-Wen Guo, Jia-Yun Lee, Heng-Hsin Liu, Heng-Jen Lee, Chin-Hiang Lin (TSMC), Wenjin Shao, Hua Cao, Antoine Bruguier, Xu Xie, Chung-Hsing Chang, Yu Cao, Ronald Goosens (Brion), Simon Hsieh (ASML)

"Model-based scanner tuning in a manufacturing environment"

2009 SPIE San Jose Meeting

Antoine Bruguier*, Kerstin Preuschoff*, Steven Quartz, and Peter Bossaerts

"Investigating signal integration with canonical correlation analysis of fMRI brain activation data"

NeuroImage, Volume 41, Issue 1, 15 May 2008, Pages 35-44

Peter Bossaerts, Antoine Bruguier, and Steven Quartz

"Human imagination in financial markets with insiders"

Neuroscience Research, Volume 58, Supplement 1, 2007, Page S5

Antoine Bruguier, Steven Quartz, and Peter Bossaerts

"A Mind for the Market: an fMRI Study of Attribution of Mental States to Financial Markets"

Poster presented at the HSD PI Meeting of the National Science Foundation in Washington, D.C. on September 15, 2006

Antoine Bruguier*, R. McKell Carter*, Christof Koch, and Steven Quartz

"SCR Recording During fMRI Acquisition"

2005 - Technical report.

* equal participation

Summary of Technical & Professional skills

Scientific skills

- Extensive knowledge of modern signal processing
 - Information theory, wavelets,
- Scientific Programming
 - Dynamic programming, graph theory, probability models
- Mathematical modeling
 - Optimization, numerical analysis
 - Advanced statistical methods

Business skills

- Course work in financial economics and introductory courses in management

List of programming languages

C, C++	C#, Objective C	Java, JavaScript
SQL	68k, PPC assembly	Matlab
PHP	OpenBSD	Unix scripts

Languages

- French: fluent
- Spanish: basic
- Mandarin: beginner

Other interests

- International business publications (The Economist, CNN/Money)
- U.S. Constitutional Law

References

Payman Arabshahi, PhD

Jet Propulsion Laboratory
National Aerospace Agency
4800 Oak Grove Drive
MS 238-343
Pasadena, CA 91109
818-393-6054
payman@jpl.nasa.gov

Peter Bossaerts, PhD

William D. Hacker Professor of Economics and Management and Professor of Finance
Computational and Neural Systems Program
California Institute of Technology
MC 228-77
Pasadena, CA 91125
626-395-4028
pbs@rioja.caltech.edu

Yu Cao, PhD

Head of Engineering
Brion (an ASML company)
421 Burton Dr
Santa Clara, CA 95054
408-653-1506
yu.cao@brion.com

Cristian Florea, PhD

Professor of Physics
École Supérieure d'Ingénieurs en Électronique et Électrotechnique
Cité Descartes - BP 99
93162 Noisy-le-Grand CEDEX
France
+33-145-92-6588
floreac@esiee.fr

Jim Lindauer, MD

Project Manager
Philips Medical Systems North America
540 Alder Dr
Milpitas, CA 95035
415-626-7824
jim.lindauer@philips.com