

# David Tagatac, M.S.

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## 1 Computer Science

### 1.1 CS Education

#### 1.1.1 University of Maryland College Park, MD

Non-degree coursework:

Winter 2010 -  
Present

- Algorithms
- Organization of Programming Languages
- Computer Organization

#### 1.1.2 University of California - San Diego La Jolla, CA

Non-degree coursework:

Fall 2008 -  
Winter 2009

- Basic Data Structures and Object-Oriented Design
- Introduction to Computer Science & Object-Oriented Programming in Java

### 1.2 CS Experience

#### 1.2.1 Undergraduate Researcher Jeff Foster's Programming Languages at University of Maryland College Park, MD

Topic Studied:

June 2011 -  
Present

- Static Typing for Ruby on Rails

Accomplishments:

- Coded implementations for load-time checking of suitability for some Rails API calls (e.g. to check that the proper database columns exist on calls to `has_and_belongs_to_many`).
- Analyzed the complete Rails associations API for similar helpful potential checking.
- Proposed a method for incorporation of these checks into the group's Rubydust utility for static typing of Ruby.

### 1.2.2 Software Engineer

#### Joint Polar-orbiting Satellite System Program, General Dynamics Information Technology Contract Greenbelt, MD

January 2010 -  
Present

##### Responsibilities:

- Co-design a system to receive, ingest, catalog metadata for, and store for thirty-four days nearly four terabytes of satellite data per day from various sources (mostly via FTP) formatted in Hierarchical Data Format 5. A subset of this data must be pushed in near-real time to two external locations via FTP and remain accessible for re-push for the life of the mission (~ two decades). All data still on the system must be quickly accessible for investigators in various locations, secure shelled in or not.
- Code a significant portion of the above-mentioned system.
- Work independently to evaluate and implement fixes/enhancements for system software issues raised by the customer (NASA Joint Polar Satellite System Program) or the above-mentioned investigators.
- Communicate progress to customers via weblog and more formal documentation.
- Train new developers on the layout and use of the system.

##### Accomplishments:

- Coded the majority of a system to produce proxy satellite data (as from sensors to be launched) from similar real data from sensors already in operation in near-real time (< six hours behind observation time). This system has been stable with hundreds of users for a year.
- Designed and coded alterations to the database and other low-level infrastructure as needed by bug fixes and enhancements to the proxy generation scripts.
- Drafted a version control policy for the group (using Subversion).

### 1.2.3 Program Analyst

#### DrFirst.com Rockville, MD

May 2009 -  
January 2010

##### Accomplishments:

- Migrated the company's source code from Microsoft Visual Source Safe to the open source SubVersion versioning system.
- Wrote scripts to automatically get, build, and create deployment file structures for eight different projects - significantly reduced the amount of engineer time on frequent builds (using Apache Ant).
- Led the quality assurance for three of ten major company projects - oversaw and/or performed new functionality and regression testing; testing automation; and coordination of cooperative testing with external parties.
- Assisted in coding bug fixes, enhancements, and new functionality for one of ten major company projects (implemented in Java).

**1.2.4 Webmaster (volunteer)**  
**Cornell Club of San Diego**  
**San Diego, CA**

October 2008 -  
May 2009

Responsibilities:

- Keep website (<http://ccsd.alumni.cornell.edu>) current with club information as communicated by other members of the board.
- Attend club board meetings to get feedback on the site and provide the same for other members of the board.

Accomplishments:

- Redesigned the format to maximize readability, navigability, and attractiveness.
- Embedded a flash video promoting a club scholarship.

**1.2.5 High School Researcher**  
**Medical Sciences Program, Freehold High School**  
**Freehold, NJ**

January 2001 -  
May 2001

Accomplishments:

- Demonstrated with a particular genetic algorithm the previously proven fact that canonical genetic algorithms will not converge to a global optimum unless the property elitism is used. (VBasic)
- Showed that differing values for initialization, crossover operation, and objective functions do not affect the dependence on elitism.

## 2 General Engineering

### 2.1 Engineering Education

#### 2.1.1 Cornell University Ithaca, NY

Bachelor of Science: Engineering Physics

Fall 2002 -  
Spring 2006

#### 2.1.2 University of California - San Diego La Jolla, CA

Master of Science: Materials Science & Engineering

Fall 2006 -  
Spring 2007

### 2.2 Engineering Experience

#### 2.2.1 Graduate Researcher Ivan Schuller's Nanoscience Group, UCSD Department of Physics La Jolla, CA

Topics Studied:

August 2006 -  
Dec 2008

- Metal-insulator transition in vanadium sesquioxide.
- Magnetoresistance of FNF trilayers containing vanadium dioxide.

Responsibilities:

- Supervise operation and maintenance of a plasma sputtering thin film deposition system.
- Supervise operation and maintenance of an X-ray diffraction system.

Accomplishments:

- Identified the proper sputtering conditions required to produce a mixture of vanadium sesquioxide and vanadium dioxide.
- Designed and implemented gas flow control system via EIA-485 interface (using LabVIEW) - operational and used daily for over a year.

#### 2.2.2 Undergraduate Researcher David Muller's Electron Microscopy Group, Cornell School of Applied and Engineering Physics Ithaca, NY

Topics Studied:

Sept 2003 -  
May 2006

- Electron Backscatter Detection (EBSD).
- Nanocharacterization of pentacene.

Accomplishments:

- Compared the imaging methods of TEM, AFM, and SEM for the characterization of the organic semiconductor pentacene and found that each method is appropriate in different situations depending on the desired information.
- Modified and ran a C implementation Monte Carlo simulations of low-voltage transmission electron microscopy and subsequent scattering through organic semiconductors similar to pentacene. Gained an estimate of expectations for real experiments performed after my graduation.
- Determined copper grain crystal orientations using EBSD in an attempt to correlate orientations with failure sites identified using SEM.

**2.2.3 Engineering Co-op  
Lutron Electronics  
Coopersburg, PA**

Sept 2004 -  
August 2005

Responsibilities:

- Provide existing product support and quality improvement for single room lighting controls.
- Conduct various standards qualification tests and other in-house tests.
- Participate in the design review process for various products.

Accomplishments:

- Identified the root cause for incompatibility with between electronic low voltage transformers and certain ground fault circuit interrupters (GFCIs), and recommended a solution to the GFCI vendor.
- Determined the optimal filament heating voltage for fluorescent lamps by measuring cathode fall.
- Drove the project to modify, qualify, specify, and document a fluorescent ballast IR transmitter.
- Found and tested alternatives to troublesome thermal cutouts.
- Assisted in the qualification testing and analysis of new FETs to be used in certain ballasts.

**2.2.4 Summer High School Apprentice Researcher  
Department of Aerospace Engineering, University of Michigan  
Ann Arbor, MI**

June 2000 -  
July 2000

Accomplishments:

- Modeled a microgravity attitude control test system. (I-DEAS CAD)
- Assisted in analysis and modification of the system.
- Tested effectiveness and extent of motor movement under realistic conditions using Lab-Tech data acquisition software.

## **3 Teaching**

### **3.1 Teaching Experience**

**3.1.1 Independent Tutor  
La Jolla, CA**

March 2009

Topics Taught:

- Calculus: 50 hours
- Chemistry: 10 hours

**3.1.2 Physics Teaching Aide  
Department of Physics, Cornell University  
Ithaca, NY**

January 2006 -  
May 2006

Responsibility:

- Provide general assistance on problem sets and laboratory experiments for students in the auto-tutorial PHYS 102. Topics included (at the introductory level): electricity and magnetism, optics, relativity, quantum, nuclear, and particle physics.