Nathaniel Guy

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Education

University of Washington **Seattle, WA**
Master of Science in Aeronautics & Astronautics Received June 2016

- Coursework included: Control in Aerospace Systems, Linear Systems Theory, Networked Dynamics Systems, State Estimation and Kalman Filters, and Rocket Propulsion.
- Thesis: "Techniques for Fault Detection and Visualization of Telemetry Dependence Relationships for Root Cause Fault Analysis in Complex Systems"

Master of Science in Computer Science Received June 2015

- Coursework included: Computer Vision, Networks, Graphics, Distributed Systems, and Data Visualization.
- Graduate Teaching Assistant: Software Engineering, Networks, and Graphics.

Georgetown University **Washington, DC**
Bachelor of Science in Computer Science; Bachelor of Arts in Japanese Received May 2005

Experience

NASA Jet Propulsion Laboratory, User Interface Development Group **Pasadena, CA**
Lead User Interface Developer May 2016–Present

- Lead the architecture and implementation of major components of the user interfaces for the next generation of spacecraft control software, including:
  - Telerobotic command and telemetry displays
  - Visualization of scientific and engineering data
  - Command and control for remote network operations
  - Highly interactive visualization authoring tools
- Responsible for architecture and development of user interfaces for rich web applications, as well as creating novel techniques to parse, analyze, interact with, and visualize large scientific data sets.

Hakuto Google Lunar XPRIZE Team **Sendai, Japan**
Masters Intern, UI/Ground Station Software Engineer July 2015–December 2015

- Principal developer for ground station software to support teleoperation and telemetry analysis for upcoming lunar rover exploration mission. In little over a month, took a rover ground station from the concept phase to a fully operational product capable of carrying out a week of field tests without major issues.
- Set up rover operation environment and operated rover in lunar-like conditions, relying on rover telemetry to make decisions to achieve mission goals while maintaining safety.
- Designed new PID controller for rover motor control. Implemented controller in C++ on a microcontroller running RTOS, and tuned gains empirically to maximize traction on regolith-like surfaces.
- Worked closely with other software engineers to plan out full software system design.
- Developed and improved various higher-level systems related to mission operation and assurance, including advanced systems for fault detection, isolation, and recovery.

SpaceX, Flight Software **Hawthorne, CA**
Flight Software Intern September 2014–December 2014

- Wrote, maintained, and executed hardware- and interface-specific tests on the testbeds for Dragon system V&V.
- Analyzed and improved testing of FDIR (fault detection, isolation, and recovery) systems for Dragon spacecraft.
- Automated NASA verification tests for launch. Turned a 20+ hour manual process into a fully-automated one, increasing comprehensiveness and reducing execution time to around 3 hours.
- Troubleshooted testbed issues, including harnessing, computer hardware, software, electrical and RF systems.
- Executed tests on the Dragon flight vehicle at the launch site.

NASA Jet Propulsion Laboratory, Human Interfaces Group **Pasadena, CA**
Software Engineering Intern June 2014–September 2014

- Developed an intuitive and innovative 3D interface for robotic calibration and manipulation, allowing precise manipulation in dynamic environments with an easily expandable library of objects and interaction methods.

Nintendo of America, Software Development Support Group **Redmond, WA**
Senior Bilingual Software Engineer June 2005–January 2007; November 2009–August 2013

- Assisted other developers through all stages of the game development process, including extensive debugging and troubleshooting, development of whitepapers, creation of tools, and assistance publishing games and DLC.
- Researched techniques to utilize controllers incorporating 3D inertial sensors, as well as visualization techniques to improve the development process. (See "Patents" section.)

Freelance Japanese Translator 2005–2009

- Translated several high-profile video game titles, as well as assorted technical and business-related documents.

Technical Skills

- Programming Languages: C#, C++, C, PythonMatlab, Javascript/HTML5.
- Platforms: PC, Mac OS X, Linux/UNIX, Arduino.
- Tools: Microsoft Visual Studio, Git, Subversion, Vim, Simulink, LaTeX, etc.
- Frameworks/Libraries: Unity, SciPy, OpenCV, OpenGL, WebGL, three.js, D3.js, etc.

Languages

- Fluent in Japanese and Spanish, including technical vocabulary. Proficient in French.

Invited Talks and Posters

- **"3D Graphics Basics."** JPL, Pasadena, CA, August 2017.
- **"Using AR/VR to Augment Space Exploration."** Augmented World Expo, Santa Clara, CA, June 2017.
- **"Augmented Reality for Space Exploration."** University of Washington, Seattle, WA, October 2016.
- **"PID Control Fundamentals."** Tohoku University, Space Robotics Lab, Sendai, Japan, October 2015.
- **"3D Telepresence Interface for Robotic Manipulation."** Tohoku University, Space Robotics Lab, Sendai, Japan, August 2015.
- **"Better Tools for Fault Diagnosis in Complex Systems."** University of Washington, Data Visualization Research Night, Seattle, WA, May 2015.
- **"Better Tools for Fault Detection, Isolation, and Recovery."** University of Washington, RAIN Lab, Seattle, WA, May 2015.
- **"Arduino Programming Basics."** University of Washington, CoMotion MakerSpace, Seattle, WA, March 2015.
- **"Flight Instruments."** University of Washington, UWAA Pilots, Seattle, WA, March 2015.
- **"Flocking."** University of Washington, Computer Science and Engineering Algorithms Club, Seattle, WA, May 2014.
- **"Automating your life: Arduino hacking for fun and profit (but mostly fun)."** University of Washington, Sudo Soldiers, Seattle, WA, April 2014.

Patents

- U.S. Patent No. 8,516,467: "Method and Apparatus for Enhancing Comprehension of Code Time Complexity and Flow." Issued August 20, 2013.
- U.S. Patent No. 8,147,333: "Handheld control device for a processor-controlled system." Issued April 3, 2012. (My name was mistakenly left off the patent, but is on an attached corrections sheet.)

Awards and Certifications

- Professional Scrum Master Level 1 certification
- Passed Japanese Language Proficiency Test (JLPT) Level 1
- Bob Bandes Teaching Award Honorable Mention (Spring 2014, from UW Computer Science department)
- Andris Vagners Memorial Fellowship recipient (Fall 2013, from UW Aeronautics & Astronautics department)

Interests

- Creator of the annual SEAHOP puzzle competition. 3 years running, with ~150 participants in 2013.
- Recreational programming: see screenname "NattyBumppo" on GitHub and Project Euler.
- Amateur astronomy, bouldering, cycling, hiking, and wildlife foraging.

Other Links

- Personal website (with lots of project details): http://www.natguy.net
- GitHub page: https://github.com/NattyBumppo/