

Jet Townsend, IDSA
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I am a designer and engineer with an interest in creating hardware and software that improves the human condition. I have more than 20 years' experience in projects including software development, analog electronics, physical computing, digital fabrication, and art projects including vehicles and small architecture. Since 2009 I have directed a small consultancy in Pittsburgh, functional prototype, which creates proof-of-concept models, working prototypes, and customized physical interaction devices. My personal and professional projects include industrial design, open-source software and hardware, motorcycle restoration, and music performance. I enjoy empowering people by teaching them how to create their own interactive projects using software, analog and digital circuits, kinematic devices, clothing, and new designs.

**Founder, functional prototype
(2009 - current)**

Design and implement open source software and user interfaces for digital fabrication, environmental monitoring, and home-scale manufacturing platforms. Enter design contests and design physical items for my online stores.

Design and create proof of concept models, working prototypes, and customized physical interaction devices using digital fabrication hardware including:

- Lasersaur, the open source laser cutter
- 3D (FDM) printers
- Embedded computers: Arduino, BeagleBone, and Raspberry Pi
- Waterjet, plasma cutter, GTAW, GMAW, and oxy acetylene welding
- 4D CNC metal mill (current project)

Portfolio: functionalprototype.com

Education

**Master of Tangible Interaction Design, Carnegie Mellon University
(May 2009)**

My research was in the areas of computational situational awareness, physical computing for tactical surveillance and fine arts, and passive haptic feedback. While a student I taught physical computing and interaction design using Arduino and Processing.

My coursework included classes in Data Visualization, Interaction Design, Live Performance and Interactive Technology, Machine Learning and Art, History of Clothing, and Advanced Japanese.

**Bachelor of Arts in Journalism, Computer Science, University of Houston,
(1991)**

Studied journalism, communications theory, photography, and propaganda; a strong minor in Computer Science.

Teaching Experience

Skill Instructor, Protohaven

(2024 - Current)

Develop and teach “clearance” classes for design and fabrication tools at the [Protohaven](#) maker space. Classes include: soldering electrical circuits, designing and using el-wire for costuming, using laser cutters, and product photography.

Adjunct Professor, Carnegie Mellon University School of Architecture, IDeATe

(Spring, 2022)

Instructor of Record for [48-339 Making Things Interactive](#) in the CMU School of Architecture taught as an IDeATe class. Students apply what they have learned in 60-223 (Introduction to Physical Computing) to create innovative interaction experiences. With 100% of students responding, my course evaluations were 5/5 for “Overall Teaching” and 5/5 for “Overall Course”.

Adjunct Professor, Carnegie Mellon University School of Architecture, IDeATe

(Fall, 2020)

Instructor of Record for [48-339 Making Things Interactive](#) in the CMU School of Architecture taught as an IDeATe class. Due to COVID-19, this class was taught 100% remote with students in various US cities, Korea, and China. Students apply what they have learned in 60-223 (Introduction to Physical Computing) to create innovative interaction experiences. With 40% of students responding, my course evaluations were 5/5 for “Overall Teaching” and 5/5 for “Overall Course”.

Adjunct Professor, Carnegie Mellon University School of Architecture, IDeATe

(Fall, 2019)

Instructor of Record for [48-339 Making Things Interactive](#) in the CMU School of Architecture taught as an IDeATe class. Students apply what they have learned in 60-223 (Introduction to Physical Computing) to create innovative interaction experiences. With 80% of students responding, my course evaluations were 4/5 for “Overall Teaching” and 4.25/5 for “Overall Course”.

Adjunct Professor, Carnegie Mellon University School of Architecture, IDeATe

(Spring, 2018)

Instructor of Record for [48-339 Making Things Interactive](#) in the CMU School of Architecture taught as an IDeATe class. Students apply what they have learned in 60-223 (Introduction to Physical Computing) to create innovative interaction experiences. With 29% of students responding, my course evaluations were 5/5 for “Overall Teaching” and 5/5 for “Overall Course”.

Adjunct Professor, Carnegie Mellon University School of Art, IDeATe

(Fall, 2017)

Instructor of Record for [60-223 Introduction to Physical Computing](#) in the CMU School of Art taught as an IDeATe class. Students learned the basics of physical computing using the Arduino, sensors, motors, speakers, and visual output devices. Course evaluations pending end of the semester. With 52% of students responding, my course evaluations were 4.08/5 for “Overall Teaching” and 4.38/5 for “Overall Course”.

Adjunct Professor, Carnegie Mellon University School of Art

(Fall, 2016)

Instructor of Record for [60-210 EMS2: Introduction to Interactivity and Computation](#) in the CMU School of Art. This is a required class for School of Art sophomores. Students learned the basics of JavaScript (using the p5.js environment) and how to create elementary interactive art. With 75% of students responding, my course evaluations were 5.00/5 for “Overall Teaching” and 4.67/5 for “Overall Course”.

Arduino Workshops, Carnegie Mellon University School of Design

(Multiple semesters, 2013 - 2017)

Guest speaker at [51-434 Experimental Form](#) introducing the Arduino environment to School of Design students creating experimental interfaces for radios.

Cybersecurity Workshops

(2016 - 2017)

Cryptoparty Workshop at the Frank-Ratchye STUDIO for Creative Inquiry, December 2016. Organized and co-taught a clinic on personal cybersecurity.

Personal Safety Workshop at a local bookstore; presented on protecting personal privacy and safety while taking actions as a political activist or artist.

Safety Workshops

While working as an artist, engineer, and educator, give presentations and classes on safety using hand tools, analog electronics, wood shop, metal shop, welding, 3D printers, laser cutters, and other fabrication tools.

Patents and Publications

- Co-author, [U.S. Patent 7933950](#), "Secure control of features of a digital device"
- Co-author, "EduSense: Practical Classroom Sensing at Scale". Proc. ACM Interact. Mob. Wearable Ubiquitous Technol., Vol. 3, No. 3, Article 71 (September 2019). <https://doi.org/10.1145/3351229>

Training and Certification

- CITI Social and Behavioral Responsible Conduct of Research
- CITI Social and Behavioral Research - Basic
- PA Child Abuse History Clearance (ID: 2UZ260N0T4)
- Red Cross CPR
- Stop the Bleed(R) Course, 2021
- Certified Pistol Instructor
- Certified Range Officer
- Advanced Master Gunsmith, American Gunsmithing Institute (AGI)
- Master Armorer, AGI
- AGI Certified Firearms Appraiser, Certification #845297
- General Class Amateur Radio license, KC3HSO

Employment Experience

Senior Engineer, Carnegie Mellon Human Computer Interaction Institute

(March 2018 - March 2019)

Design and develop software for an HCII project under Prof. Amy Ogan. Design and implement a GUI for controlling OpenPose settings during the development stages, customize OpenPose for research goals, research camera location and configuration, set up a job scheduling system to drive the recording of actual classes for research (IRB approved), help graduate students with development and testing of modules, co-author paper(s) when appropriate. This is a one-year contract with a termination date in March, 2019.

Consulting and Research

(October 2014 - Current)

- Work for clients under NDA
- Enter DJI/Shapeways “Drone Accessory” Contest, win Honorable Mention
- Design and develop new laser cutter control interface
- Design and fabricate products for Etsy and Shapeways stores

UI Engineer, Apple

(January 2012 - October 2014)

Implemented UI software requirements in Objective C for OSX and iOS applications in the Apple Productivity Tools and iWork products. Reported and fixed bugs in iWork products.

Independent Research Project

(January 2011 - January 2012)

Worked on a research project involving interaction design, music, and mechanical/kinematic live performance.

Senior Security and Privacy Engineer, TiVo Inc.

(June 2001 - January 2011)

Developed policies, protocols, and software tools to protect customer security and privacy on all components of the TiVo product line and service. Designed and implemented user interfaces and navigation systems implementing TiVo’s privacy and security policies. Wrote and taught in-house classes on hacking, security, and customer privacy. Designed and developed machine learning tools that analyze TiVo’s large, anonymous, and proprietary data collections.

Co-author on [U.S. Patent 7933950](#), designed and implemented infrastructure for provisioning TiVo DVR service in a secure manner.

Independent Consultant

(June 1998 - June 2001)

Worked with startups delivering handheld solutions and secure online commerce. Provided technical editing services for [Teach Yourself Perl in 21 Days](#) by Laura Lemay.

Senior Software Engineer, Liquid Audio, Inc.

(April 1997 - June 1998)

Designed and developed online commerce systems and musical recording rights reporting systems

Multiple Roles, General Magic, Inc.

(July 1994 - April 1997)

Performed tasks as IT tech lead, software engineer, and the Manager of Online Communications.

Parallel Systems Engineer, NASA Ames Numerical Aerodynamic Simulations Division

(July 1992 - July 1994)

Developed graphic data visualization software and simulation tools for the massively parallel super computers iPSC/860, CM-5, and Paragon.