Sam Ingersoll

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Experience

Grossman Group, MIT, *Research Assistant*
Cambridge, MA
Biomimetic Robotics Lab, MIT, *Research Assistant* *Cambridge, MA*
UBC Orbit Design Team, *Payload Design* *Vancouver, BC*
IDEO, *VR Design Consultant* *Cambridge, MA*
Recurse Center, *Computer Science Research* *New York, NY*
Allen Brain Sciences Institute, *3D Visualization* *Seattle, WA*
Lauder Lab, Harvard University, *Research Assistant* *Cambridge, MA*
Biodesign Lab, Wyss Institute, Harvard University, C*ambridge, MA*
Soft Robotics Engineering Intern
Formlabs, *Interim Print Farm Manager* *Somerville, MA*

Education

MIT *Cambridge, MA*
Courses: Multivariable Calculus, Differential Equations, Introduction to Electrical Engineering with Medical Technology, Electrical Engineering and Computer Science Project
February 2018 - May 2018

University of British Columbia (UBC) *Vancouver, BC*
Undergraduate (full-time, one school year)
Courses: Derivative and Integral Calculus, Linear Systems; Computation in Engineering Design; Mechanics; Physics I and II; Laboratory Physics; Chemistry; Engineering Design I and II; Philosophy: Minds and Machines; English Composition
Sept 2016 - April 2017

Cambridge Rindge and Latin School *Cambridge, MA*
High school (3 years, took one year off to attend NuVu)**.** Graduated June 2015.
Sept 2011 - June 2015

NuVu Studio *Cambridge, MA*
Project-based design and engineering program (full-time, one school year)
Sept 2013 - May 2014

Skills

Programming: Java, Processing, Python, C, C#, JS, HTML, CSS, Arduino
3D Modeling: Maya, C4D, Arnold, Zbrush, Rhinoceros, Grasshopper
General: Photoshop, Illustrator, Flash, After Effects, Unity 3D

Publications

Contact model fusion for event-based locomotion in unstructured terrains, G Bledt, PM Wensing, S Ingersoll, S Kim, 2018, 2018 IEEE International Conference on Robotics and Automation (ICRA).

- IEEE Robotics and Automation Society Best Conference Paper Award – Finalist
- IEEE Robotics and Automation Society Best Student Paper Award – Finalist

Scale diversity in bigeye tuna (Thunnus obesus): Fat-filled trabecular scales made of cellular bone, DK Wainwright, S Ingersoll, GV Lauder, 2018, Journal of morphology 279 (6), 828-840

Exhibitions

Bipedal Robot 01* at the 2018 IDEO Future Fest*; *2018*
***Variations* at the MIT Museum;** 2014-2015
***Body Accordion* at Boston Fashion Week;** 2013
***Lionfish Dress* at Boston Fashion Week;** 2010

Experience Details

Fall 2018 - Ongoing

Grossman Group – MIT

Cambridge, MA

Research Assistant

Responsible for the design, prototyping, and manufacture of lased tar film devices for power generation and transparent electronic applications. Research ongoing.

Supervisor: Xining Zang, xzang@mit.edu

Summer 2017 - Summer 2018

Biomimetic Robotics Lab – MIT

Cambridge, MA

Research Assistant

Assisted in the design, data collection, and optimization of an algorithm for robust contact detection and contact probability estimation for the MIT Cheetah 3 robot. Reliable contact detection is an open problem in legged robotics; it is necessary for complex, varying, and emergent gaits, movement on rough terrain and in a human environment, and for robust balance.

Programming: Matlab
Supervisor: Albert Wang, adwang@mit.edu

Spring 2017

UBC Orbit Design Team — *Vancouver, BC*

Payload Design

Responsible for the design of image processing algorithms (blind deblurring, denoising) and calculation of the satellite's heading angle from the derived blur kernel. Involved in implementing algorithms on digital signal processor. Writing and training image classifier to detect and report forest fires live from orbit on mobile GPU.

Hardware: Custom Satellite
Programming: Python

Summer 2016

IDEO — *Cambridge, MA*

VR Design Consultant

I had a short design fellowship at IDEO designing and building a virtual reality application which enabled designers and clients to experience the products that they were working on at any stage of the design process. The application enabled designers and clients to make informed decisions about the look and experience of the products without having to fabricate a physical model.

Hardware: HTC Vive
Game Design: Unreal Engine
3D Modeling: Maya, C4D
Supervisor: Jason Robinson, jrobinson@ideo.com

Spring 2016

Recurse Center — *New York, NY*

Programming Research

I was selected to be one of 3 pre-college students of the 50-person Spring 1 batch at the Recurse Center. I spent ~75 hours a week for three months doing self-directed research on machine learning. I focused on implementing my own neural networks from the ground up in order to ensure that I deeply understood the material. I focused on convolutional networks, recurrent networks, and monte carlo optimization techniques.

Programming: Python, Java

Spring 2016

Allen Brain Sciences Institute — *Seattle, WA*

3D Visualization

I was hired to create the key image of the Brain Atlas Team's breakthrough neural mapping paper. The visualization focused on a specific network of neurons for a feature on the Allen Brain Sciences website and a feature article on the *Science* Magazine website. I was given

spatial data gathered from thousands of slices of mouse brain and reconstructed and rendered the scene in a way that met the researchers' communication goals.

Rendering, Scripting: Cinema4D, Maya, Zbrush, Python
Client: Dr. Clay Reid, Senior Investigator, clayreid@gmail.com

Summer 2015 - Fall 2016

Lauder Lab – Harvard University

Cambridge, MA

Research Assistant

Harvard's Lauder Lab is leveraging innovations in modeling, rapid prototyping, finite element analysis, and computation fluid dynamics to address unanswered research questions in marine animal biomechanics, behavior, and biology. I was hired by the lab for my 3D modeling, parametric design, 3D printing, and programming experience to improve their modeling, analysis, and rapid prototyping pipeline. I am on one publication and am involved in preparing several other papers for publication.

• Programmatic and parametric 3D models of natural phenomena. Including the creation a pipeline for producing biologically accurate, 3D-printed birds eggs, with realistic coloration and multi-material fish scales for exploring the hydrodynamics of scale morphology.
• Large-scale morphological studies using innovative 3D surface reconstruction techniques being pioneered at the Lauder Lab.
• Big data analysis of animal tracking data for morphological and behavioral studies.
• Analyzing CT scans of fish scales to determine the insulating value of the scales.

Data science/Big data analysis/Figure making: Python
Parametric 3D design/Design for 3D printing: Grasshopper, Rhino, C#
Supervisor: Dr. George Lauder, Director, glauder@oeb.harvard.edu

Spring 2015

Biodesign Lab, Wyss Institute - Harvard University

Cambridge, MA

Soft Robotics Engineering Intern

I was brought in to implement the lab's existing soft robotics design theory to build easily manufactured biomimicking soft robots. I designed and built a parametric silicone wing mold based on manta ray biomechanics. Key aspects of the project were concept, design, and prototyping of underwater soft robots using pneumatic actuation, a presentation to faculty at Harvard, web design and documentation for the soft robotics toolkit.

Parametric 3D design/Design for 3D printing and silicone casting: Grasshopper, Rhinoceros

Reference: Paul McGuinness, pmcg.crls@gmail.com

Summer 2014

Formlabs *Somerville, MA*

Interim Print Farm Manager

I was the only high school student to be hired by Formlabs, a desktop 3D printing startup spun out of MIT's Media Lab. I managed 24 3D printers; printing, packaging, and mailing ~ 200 sample parts a week for customers; printing special sample parts for companies and important customers; bug testing and reliability testing with the Engineering Team; assisted photographer in creating promotional materials. Was offered permanent position at the end of the summer.

Reference: Virginia White, virginia@formlabs.com

Exhibitions

Bipedal Robot 01 **at the 2018 IDEO Future Fest**

Bipedal Robot 01, is a prototype walking robot. It uses its 12 brushless motors to move around and is controlled by a small Linux computer and custom motor drivers. The robot will serve as a platform for exploring dynamic mobility, computer vision, environmental mapping, path planning, and human-robot interaction.

Variations **at the MIT Museum**

Variations was a two-year long interactive electronic exhibition at the MIT Museum in 2014-15 showcasing the creative license that classical musicians have when performing a piece. The piece allowed the user to dynamically adjust the velocity and timing of events – chords or notes – in the performance of Anton Webern's *Variations For Piano Op. 27*, *Variations For Piano*. The main interactive component of the piece was a row of sliders, each of which represents an event in the piece that the user can move, adjusting the micro-timing between events, allowing the user to hear the changes that these micro-differences effect in the piece.

Body Accordion **at Boston Fashion Week**

Body Accordion is an interactive, exoskeletal dress/instrument that was displayed on the runway at Boston Fashion Week in October 2013. The piece is made from recycled plywood and recycled leather, it translates subtle movements from the wearer's core into haunting music, enabling the dancer to create her/his own accompaniment.

Lionfish Dress **at Boston Fashion Week**

The *Lionfish Dress* is a biomimicking homage to the lionfish; the objective was to capture the danger, beauty, and mystique of this amazing animal in a single garment. I designed the *Lionfish Dress* and worked with Tess Avery to fabricate the final piece that was displayed at Boston Fashion Week in 2010.