

# John Turner

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## Education

### Georgia Institute of Technology

- **PhD Program (Fall 2017 – Fall 2019) Leave of Absence as of 11/19 – GPA: 4.0**
- **Masters of Computer Science (Fall 2014 - Fall 2016) - GPA: 4.0.**
- **All CS(24) and Math(5) classes required for Bachelor of Computer Science (2010-2014) - GPA : 4.0.**
- **Bachelor of Electrical Engineering (1986-1992)**

### Academic Awards

- **2014 The Donald V. Jackson Fellowship.**
- **2014 Outstanding Graduate TA**

## Professional Experience Summary

- Languages : C++, Python, GLSL, Java, C#, C, R, SQL, Blender script, MEL, MATLAB, Javascript, Pascal.
- ML-based built in/with : PyTorch(Pix2Pix), TensorFlow(Cond-GAN), Somoclu(Clustering, Look-Alikes), others.
- TA'ed 9 undergraduate/graduate CS classes at Georgia Tech that required instructional ability in C++, Python, Java, C, and OpenGL.
- Cross-platform Implementations using C++/Python, C++/MATLAB, Java/C++, Python/MATLAB, Python/R/SQL.

## Work and Paid Research/TA'ing Experience

### Facebook/Meta AI Research : 2/23 to 2/25; 3/20 to 3/22. Contingent Research Engineer 3 on AIHabitat.org team

Primary contributor to Habitat-Sim high performance simulator (C++) for RL training embodied agents. Designed and implemented multiple systems in C++ including rendering, scene instantiation, dataset management and instantiation (assets, materials, metadata and configurations), physics-based rigid and articulated object management, Python bindings, tools to edit meshes, isometric camera view model, synthesize meshes to visualize trajectories and other simulation and graphics-oriented functionality. KHR-compliant PBR, IBL and HBAO+ (based on Nvidia reference) shaders and texture-based Semantics rendering. Hierarchical Class-template-based type-agnostic database/configuration system to manage and consume dataset metadata and assets. Extensive bindings to provide external Python access to all subsystems in simulator. Reorganized CMake project to remove dependency cycles and speed up compilation. Python systems include tools and applications to provide scene access, analysis and editing, as well as Python and Blender protocol for deconstructing aggregate scenes into constituent pieces to follow Habitat dataset protocol so they can be reconstructed in engine.

### VisionWrights : 11/13-12/23. AI Consultant

Implemented a Pix2Pix-based model from scratch in PyTorch on first day to infer the geometry and orientation of house roofs from satellite images as segmentation overlays(encoding orientation as hue) to synthesize appropriate solar panel placement proposals. Rebuilt the system that consumed the segmentation output and procedurally generate the actual panel placements, and built an end-to-end system to provide the requested proposals. Streamlined system to facilitate automation.

### Georgia Tech : 8/17 to 1/20. Graduate Research Assistant (PhD research)

Advised by **Dr. Karen Liu** (8/17-1/19) Research focus on predicting optimal robotic control to assist an impaired biped in performing locomotion tasks, such as getting up, using RL and MPC paradigms by finding optimal input using Value Function optimization. Using Conditional GAN to synthesize non-linear camera transformations.

Advised by **Dr. Jarek Rossignac** (1/19-1/20 (LOA)) Researched using music to synthesize animation through signal analysis, deriving trig-based alternatives to Gaussians for sampling in ray tracing, and animating COTS patches to derive pleasing morphs.

### Georgia Tech : 8/17 to 1/20. Graduate Teaching Assistant (PhD)

Head TA for **Intro to Graduate Algorithms** (CS 6505/6515) class for the **Online Master's Program**. Classes consisted of 350-500 students. Along with sharing exam grading duty, was solely responsible for coding projects (Bloom Filter, PageRank, Knapsack and Kruskal's algorithm), including designing code templates and building multi-process autograder (Python), assisting all students via discussion and video lessons, and grading all code and report submissions.

### Ignition One : 10/13 to 11/16. Sr Software Engineer / Data Scientist & Algorithmic Specialist

Built Linux/Python-based Tornado web servers to manage multiple instances of R environment running various analytic processes on clients' advertising performance. Wrote Reference Class R scripts and cron jobs to analyze and predict trends in inherently chaotic time series data using non-parametric algorithms such as Singular Spectrum Analysis; find potential marketing targets based on similarities to known converters using hierarchical SOMs, perform moments and time series analysis to optimize client revenue and spend, and predict optimal spend across different ad channels using regression.

### Georgia Tech : 1/15 to 1/17. Graduate Teaching Assistant (Master's Degree)

TA'ed **Undergraduate and Graduate Computer Animation** class (CS 4496/7496) in Spring 2015, Spring 2016 and Fall 2016, helped students learn MEL scripting in Maya and to code (in C++) particle, rigid body (Baraff/Witkin) and fluid (Stam) simulations, and IK solver. Lectured CS7496 on Fluid Dynamics Simulation using Eulerian Grids. Proctored and graded projects and final exams.

TA'ed **Graduate Graphics** course (CS 6491) in Fall 2015. Graded all submitted assignments and exams, assisted students in understanding and implementing optimized particle simulations, steady affine motion and morphs, 3D curve averaging. Derived mechanism for students to implement all questions from a difficult mid-term as part of regrade process. Derived final grades with approval of Professor.

### **Georgia Tech : 5/13 to 8/17. Undergraduate/Graduate Research Assistant**

Built C++ Microsoft SDK-based Kinect library to be used with DART animation/physics simulation library, using motion-capture/IK solver, Voice and Gesture Recognition (included custom internal Neural Net to classify hand state) and custom Kinect-based UI components sliders, textboxes, levers, CBs. Implemented C++ SIMBICON state-machine-based controller in DART. Implemented data capture protocol via MATLAB in C++ to transparently collect and analyze performance of various biped controllers in comparison to biomech benchmark data. Used CMA-ES to improve controllers based on low dimensional data using worst performing biomech benchmarks. Implemented C++/DART version of Control-PBP algorithm (Hämäläinen et al. 2015).

### **Georgia Tech : 5/12 to 5/13 Undergraduate Research/Teaching Assistant**

Built force-based erosion simulation of height-field fluids (shallow water equations) eroding fractally (Square-Square subdivision – Musgrave '89) and procedurally generated terrain using shallow water equations in a closed system. Developed novel approaches for eroding adjacent dry terrain (mass wasting) and transporting sediment during fluid transport calculation (Semi-Lagrangian method). Built full UI using OpenGL able to completely control simulation, analyze results and visualize processes.

Undergraduate TA of 6 different CS courses : **CS 1050 Discrete Mathematics and Proofs**, **CS 1331 Intro to OOP (Java)**, **CS 2110 Computer Organization and Programming(C)**, **CS2200 Intro to Systems and Networking (C)**, **CS 3451 Intro to Graphics(Java/Processing)**, and **CS 3600 Intro to AI(Python)**; Suggested and developed assignment for CS 3600 Intro to AI class for students to implement multiple hidden layer Neural Net with Back Prop that is still used.

### **Publications – All at Meta**

#### **PARTNR: A Benchmark for Planning and Reasoning in Embodied Multi-agent Tasks (2024):**

Matthew Chang, Gunjan Chhablani, Alexander Clegg, Mikael Dallaré Cote, Ruta Desai, Michal Hlavac, Vladimir Karashchuk, Jacob Krantz, Roozbeh Mottaghi, Priyam Parashar, Siddharth Patki, Ishita Prasad, Xavier Puig, Akshara Rai, Ram Ramrakhya, Daniel Tran, Joanne Truong, John M. Turner, Eric Undersander, Tsung-Yen Yang

#### **HomeRobot: Open-Vocabulary Mobile Manipulation (2024):**

Sriram Yenamandra, Arun Ramachandran, Karmesh Yadav, Austin Wang, Mukul Khanna, Theophile Gervet, Tsung-Yen Yang, Vidhi Jain, Alexander William Clegg, John Turner, Zsolt Kira, Manolis Savva, Angel Chang, Devendra Singh Chaplot, Dhruv Batra, Roozbeh Mottaghi, Yonatan Bisk, Chris Paxton

#### **HABITAT 3.0: A Co-Habitat For Humans, Avatars AND Robots (2023):**

Alexander William Clegg, Xavi Puig, Eric Undersander, Andrew Szot, Mikael Dallaré Cote, Tsung-Yen Yang, Ruslan Partsey, Ruta Desai, Michal Hlavac, So Yeon Min, Vladimir Vondruš, Theophile Gervet, Vincent-Pierre Berges, John M. Turner, Oleksandr Maksymets, Zsolt Kira, Mrinal Kalakrishnan, Jitendra Malik, Devendra Singh Chaplot, Unnat Jain, Dhruv Batra, Akshara Rai, Roozbeh Mottaghi

#### **Habitat-Matterport 3D Semantics Dataset (2023):**

Karmesh Yadav, Ram Ramrakhya, Santhosh Kumar Ramakrishnan, Theo Gervet, John Turner, Aaron Gokaslan, Noah Maestre, Angel Xuan Chang, Dhruv Batra, Manolis Savva, Alexander William Clegg, Devendra Singh Chaplot

#### **Habitat-Matterport 3D Dataset (HM3D): 1000 Large-scale 3D Environments for Embodied AI (2021):**

Santhosh K. Ramakrishnan, Aaron Gokaslan, Erik Wijmans, Oleksandr Maksymets, Alex Clegg, John Turner, Eric Undersander, Wojciech Galuba, Andrew Westbury, Angel X. Chang, Manolis Sava, Yili Zhao, Dhruv Batra

#### **Habitat 2.0: Training Home Assistants to Rearrange their Habitat (2021):**

Andrew Szot, Alex Clegg, Eric Undersander, Erik Wijmans, Yili Zhao, John Turner, Noah Maestre, Mustafa Mukadam, Devendra Chaplot, Oleksandr Maksymets, Aaron Gokaslan, Vladimir Vondrus, Sameer Dharur, Franziska Meier, Wojciech Galuba, Angel Chang, Zsolt Kira, Vladlen Koltun, Jitendra Malik, Manolis Savva, Dhruv Batra

### **Patent**

**2015 : System and Method for Forecasting of Asset Marketing** Webb, Murray, John Turner, and Caroline McConnell, Patent Application No. 14/887600, October 20, 2015

### **Older Software Development Work Experience (since 1992)**

#### **Abel Solutions, Inc. 5/00 to 10/06.**

Developed power transformer tracking application for Marietta Power Company in C#/Net 1.1. Customized multiple SharePoint-based corporate intranets based on individual client needs. Designed and developed informational intranet used by marketing department of Coca-Cola Enterprises. Web based internal intranet discussion/reporting system for Pfizer(client).

#### **Computer Associates International, Inc. 3/93 to 5/00.**

Led Team to build Windows GUI for 400+ screen client/server HR product via code generation. Developed new C-based constructs used in GUI by other CA developers. Led 4 QA/Beta/Release cycles of the GUI product. Co-authored technical documentation and user manuals.