

## David Durst

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### EDUCATION

**Stanford University**, Stanford, CA Sep 2017 – Aug 2024 (Expected)  
*Degrees:* Ph.D. in Computer Science (2024 Expected); M.S. in Computer Science (2021)  
*Research:* Imitating Human Movement Within Video Game AI Constraints  
*Advisers:* Kayvon Fatahalian, Pat Hanrahan

**Princeton University**, Princeton, NJ Sep 2011 – Jun 2015  
*Degree:* B.S.E. in Computer Science with Certificate (Minor) in Finance, *summa cum laude*  
*Advisers:* Mark Braverman, Kai Li

### SELECTED PUBLICATIONS AND PREPRINT

#### Final Research Paper – Under Submission

Durst et al.

This preprint is under submission and is available upon request

#### Type-Directed Scheduling of Streaming Accelerators

Durst, Feldman, Huff, Akeley, Daly, Bernstein, Patrignani, Fatahalian, Hanrahan  
Programming Language Design and Implementation (PLDI) 2020

#### AHA: An Agile Approach to the Design of Coarse-Grained Reconfigurable Accelerators and Compilers

Koul, Melchert, Sreedhar, Truong, Nyengele, Zhang, Liu, Setter, Chen, Mei, Strange, Daly, Donovick, Carsello, Kong, Feng, Huff, Nayak, Setaluri, Thomas, Bhagdikar, **Durst**, Myers, Tsiskaridze, Richardson, Bahr, Fatahalian, Hanrahan, Barrett, Horowitz, Tornng, Kjolstad, Raina

ACM Transactions on Embedded Computing Systems (TECS) 2023

#### Creating an Agile Hardware Design Flow

Bahr, Barrett, Bhagdikar, Carsello, Daly, Donovick, **Durst**, Fatahalian, Feng, Hanrahan, Hofstee, Horowitz, Huff, Kjolstad, Kong, Liu, Mann, Melchert, Nayak, Niemetz, Nyengele, Raina, Richardson, Setaluri, Setter, Sreedhar, Strange, Thomas, Tornng, Truong, Tsiskaridze, Zhang

Design Automation Conference (DAC) 2020

### INDUSTRY WHITE PAPER

#### Hallucinations: Baiting Cheaters Into Self-Identifying by Reversing Detection

Durst, Taylor

[activision.com/cdn/research/hallucinations](https://activision.com/cdn/research/hallucinations)

### ACADEMIC RESEARCH

#### Imitating Human Movement Within Video Game AI Constraints

Sep 2020 – Present

*Advisers:* Kayvon Fatahalian and Pat Hanrahan

[github.com/David-Durst/csknow](https://github.com/David-Durst/csknow), [davidbdurst.com/blog/](https://davidbdurst.com/blog/)

- Analyze human behavior traces and train model to imitate humans
- Train efficient transformer-based learned movement controller within the AI performance constraints of a commercial video game
- Curate 123 hour dataset of expert human movement
- Design and execute user study demonstrating learned movement model best imitates humans
- Create quantitative metrics evaluating similarity to human behavior distribution

#### Aetherling: Type-Directed Scheduling of Streaming Accelerators

Jan 2018 – Apr 2021

*Advisers:* Kayvon Fatahalian, Pat Hanrahan, and Marco Patrignani

[aetherling.org](https://aetherling.org)

- Created languages: express image processing applications that compile to statically scheduled, streaming hardware accelerators
- Developed space-time type system: express trade-offs between throughput and resource utilization
- Implemented auto-scheduling compiler: trade-off throughput and resources while preserving semantics with type-directed rewrite rules
- Generated FPGA designs: use fewer resources than designs created by comparable systems

<b>PRESENTATIONS</b>	<b>Hallucinations: Baiting Cheaters Into Self-Identifying by Reversing Detection,</b> March 2023 Game Developers Conference (GDC) 2023 – Online Game Technology Summit
	<ul style="list-style-type: none"> <li>• Anti-cheat and cheat developers in cat-and-mouse cycle: anti-cheat struggles to improve behavior detectors while cheaters easily change behavior generators</li> <li>• Create hallucinations with configurable behavior: reverse cycle by enabling anti-cheat to generate behaviors cheaters must detect</li> <li>• Demonstrate effectiveness: three popular cheat programs fail to detect hallucinations</li> </ul>
	<b>Aetherling: Type-Directed Scheduling of Streaming Accelerators,</b> PLDI June 2020 youtu.be/hsFMzMnbug – see description above in Academic Research
	<b>TopNotch: Systematically Quality Controlling Big Data,</b> Spark Summit East Feb 2016 youtu.be/PViAINQ1q5s
	<ul style="list-style-type: none"> <li>• Big data quality control system with accessible interface for users across the technical spectrum</li> </ul>
<b>PROFESSIONAL ACTIVITIES</b>	<b>The First Workshop on Computer Vision for Video Games (CV<sup>2</sup>)</b> Fall 2024 Program Cmte Member, European Conference on Computer Vision
	<b>Workshop on Languages, Tools, and Techniques for Accelerator Design (LATTE) 2021</b> Spring 2021 Program Cmte Member, Architectural Support for Programming Languages and Operating Systems
<b>TEACHING EXPERIENCE</b>	<b>CS 348K: Visual Computing Systems,</b> Stanford University Spring 2021 Course Assistant
	<b>CS 149: Parallel Computing,</b> Stanford University Fall 2020 Course Assistant
	<b>COS 318: Operating Systems,</b> Princeton University Fall 2013 Teaching Assistant
<b>WORK EXPERIENCE</b>	<b>Activision Blizzard, Inc.,</b> Remote June 2021 – June 2022 Student Associate, Global Analytics
	<ul style="list-style-type: none"> <li>• Deployed behavioral anti-cheat feature to production Call of Duty game</li> <li>• Prototyped novel ways to measure player behavior in production Call of Duty game</li> <li>• Modeled player churn using survival analysis techniques</li> </ul>
	<b>Adobe Inc.,</b> Remote June 2020 – September 2020 Creative Technologies Lab Intern
	<ul style="list-style-type: none"> <li>• Prototyped Halide-to-FPGA compilation toolchain</li> <li>• Modeled performance of image processing applications on FPGAs, CPUs, GPUs, DSPs, and TPUs</li> <li>• Predicted that DSPs offer better performance per watt for target applications than FPGAs</li> </ul>
	<b>BlackRock, Inc.,</b> New York, NY Summer 2014, Aug 2015 – Jun 2017 Financial Modeling Group Intern & Analyst
	<ul style="list-style-type: none"> <li>• Led development of TopNotch and Escher, interactive big data visualization system, using Spark</li> <li>• Modeled mortgage-backed securities for portfolio managers using loan level data sets</li> </ul>
	<b>Bridgewater Associates, LP,</b> Westport, CT Summer 2013 Technical Associate Intern, Research Technology
<b>AWARDS HONORS ACTIVITIES</b>	National Science Foundation Graduate Research Fellowship Fall 2017 – Summer 2022
	Stanford Graduate Fellowship in Science & Engineering Fall 2017 – Summer 2022
	Phi Beta Kappa (early induction for 27 members of graduating class) Fall 2014
	Mentor, Stanford Undergraduate Research Association Winter 2020 – Spring 2023
	Code/Interactive, a Code.org Partner, Mentor NYC High School Students Fall 2015 – Spring 2017