Alexandros Haridis

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RESEARCH INTERESTS

Geometric Computing and Structural Mathematics; Shape Grammars and Grammatical Description; Pedagogy and Applications of Artificial Intelligence; Computational Learning and Interpretability; Perception Research; Traditional and Contemporary Aesthetics

EDUCATION

2022 **Ph.D. in Architecture: Design and Computation**, Department of Architecture
Massachusetts Institute of Technology. GPA: 5.0/5.0

2017 **M.S. in Computer Science**, Department of Electrical Engineering & Computer Science
Massachusetts Institute of Technology. GPA: 5.0/5.0

2016 **SMArchS in Design and Computation**, Department of Architecture
Massachusetts Institute of Technology. GPA: 5.0/5.0

2014 **Diploma Architect-Engineer** (M.Arch. equivalent)
Aristotle University of Thessaloniki. GPA: 9.0/10.0

PUBLICATIONS

Peer-reviewed Journal Articles

2022 "Geometry of Point-Line Arrangements Containing Shapes: Mathematical Properties and Applications." **A. Haridis**
Computer-Aided Design Journal [Forthcoming]

"Analysis of Shape Grammars: Continuity of Rules." **A. Haridis**, George Stiny
Environment and Planning B: Urban Analytics and City Science
doi:10.1177/23998083211044734

2021 "SHREC'21: Quantifying Shape Complexity." MF Arslan, **A. Haridis**, PL Rosin, S Tari, C Brassey, JD Gardiner, A Genctav, M Genctav.
Computers & Graphics 102: 144—153

2020 "Structure from Appearance: Topology with Shapes, without Points." **A. Haridis**
Journal of Mathematics and the Arts 14(3): 199—238

"The topology of shapes made with points." **A. Haridis**
Environment and Planning B: Urban Analytics and City Science 47(7): 1279—1288

Book-length Teaching Notes

2018-present *Introduction to Artificial Intelligence: 6.034 Teaching Notes*
Department of Electrical Engineering and Computer Science, MIT
A. Haridis, P. H. Winston, K. Koile, R. Davis
- Distributed to staff and students of "6.034/6.844 Aritificial Intelligence" since Fall 2020.

PhD Thesis

2022 Visual Calculating Aesthetic Value: Formals Models of Description and Evaluation
Department of Architecture, Massachusetts Institute of Technology
Committee: Prof. George Stiny (advisor), Prof. Terry Knight, Prof. Caitlin Mueller

AWARDS AND HONORS

2022 **Hyzen Fellowship, Massachusetts Institute of Technology**
For the last semester of doctoral studies, 2021/2022

2019 - 2022 **Onassis Foundation Scholar**
Awarded to Greek students studying full-time in a doctoral program in the US

2018 **Bill Mitchell++ Award, Massachusetts Institute of Technology**
Awarded for doctoral research in design and computation

2017 **Presidential Fellowship, Massachusetts Institute of Technology**
Awarded to 1 student in the Department of Architecture for doctoral studies in computation

2015 - 2017 **AG Leventis Foundation Scholar**
Two-year Scholarship for full-time master's studies in the US

2018 **Graduate Student Council Travel Fund Grant**
Selected from the MIT Graduate Student Council

2016 - 2018 **Avalon Travel Grant**
Multiple grants awarded for presentation at international conferences

2015 **Hyzen Fellowship, Massachusetts Institute of Technology**
One-semester tuition and stipend for master's research, 2015/2016

2015 **Finalist, NASA Centennial Challenge: 3D Printed Habitat**
Design and construction competition with the Digital Structures Group

2015 **Gerondelis Foundation Grant**
Awarded for master's research at MIT

2014 - 2016 **Graduate Fellowship, Massachusetts Institute of Technology**
Two-year fellowship for master's studies in design and computation

2014 **Highest Honors, Diploma Architect-Engineer, AUTh**
Distinction for graduating in the highest tier from the Department of Architecture

2011, 2013 **15th and 16th Biennale of Young Artists, BJCEM**
Among 15 representative artists from the Mediterranean in Europe

TEACHING EXPERIENCE

2016, 2018 **6.034/6.844 Artificial Intelligence**
Massachusetts Institute of Technology, Department of Electrical Eng. & Computer Science
Teaching Assistant for Fall 2016 and 2018 (~350 students). *Evaluation Score*: 6.7/7.0
• Taught two-hour weekly recitations on technical topics, developed material for quizzes and exams, held weekly office hours and forum discussions on coding homework, exams grading, development of comprehensive teaching notes

2017-2021 **4.542/4.581 Proseminar in Computation**
Massachusetts Institute of Technology, Department of Architecture
Teaching Assistant for Fall/Spring (~10 graduate students)
• Led seminar discussions and selection of readings in topical areas of research in computation, artificial intelligence, linguistics, literary criticism, aesthetics, design theory

2019-2021 **4.540 Introduction to Shape Grammars I & II**
Massachusetts Institute of Technology, Department of Architecture
Teaching Assistant for Fall/Spring (~15 undergraduate and graduate students)
• Prepared and delivered guest lectures on shape algebras and topology, rule-based systems

2017 **DME100 Research in Design Computation**
Boston Architectural College, Boston, Massachusetts
Course development and Lecturer, Spring 2017 (~8 undergraduate students)
• Developed an introductory course to design computation research and scholarship.
Topics: Design space exploration, shape grammars, parametric design and geometric shape representations, historical and intellectual connections with computer science, artificial intelligence, perception research, and design theory

2015-2020 **Architecture and Design Studios** (various)
Massachusetts Institute of Technology, School of Architecture and Planning

• *4.024 Architecture Design Studio II* (~12 undergraduate students), Spring 2020
Participated in weekly crits, assisted in design idea development for projects related to public infrastructure buildings, material and fabrication techniques

• *4.s56 Special Subject in Computation* (~10 graduate students), Spring 2020
Participated in weekly project crits for small-scale design objects, assisted with homework assignments on generative design and 3d printing

• *MAS.650/4.110 Design Across Scales and Disciplines* (~100 students), Spring 2015
Participated in project crits for 10 student teams, led creative coding assignments.
Interdepartmental course for undergraduate/graduate students from 5 Schools of the Institute

• *4.154 Architecture Design Option Studio* (~12 graduate students), Fall 2014
Participated in weekly design crits for small-scale public structures on Charles river's banks, led one-on-one sessions, assisted in drawing, fabrication, and project documentation

RESEARCH EXPERIENCE

2018-2022 **PhD Researcher, Department of Architecture, Massachusetts Institute of Technology**
Research Topics: Structural Mathematics in Architecture and Design, Geometric Methods of Shape Embedding, Shape Grammars, Rule-Based Evaluation of Aesthetic Qualities
Advisor: Prof. George Stiny

06—09/2019 **Research Intern, OPT Industries Inc., Cambridge, MA**
Led research on the efficient representation and transfer of CAD geometry to CNC machines

09—12/2016 **Research Assistant, Genesis Group, MIT CSAIL**
Mentor: Prof. Patrick H. Winston
Conducted experimental studies aimed at understanding language-enabled descriptions for envisioning and recreation of 3D spatial configurations

06—12/2015 **Research Assistant, Digital Structures Group, MIT Department of Architecture**
Mentor: Prof. Caitlin Mueller
Worked on topics in computer graphics and shape modeling for applications in computational structural design and design space exploration

SELECTED TALKS AND WORKSHOPS

Mar 2021 **Eurographics 2021, SHREC'21 Workshop Track on "Quantifying Shape Complexity" for 3D Objects Retrieval**
Workshop track co-organizer

Dec 2020 **Research Topics in Computation and Design, National Technical University of Athens Post-Graduate Program (virtual)**
Invited speaker

Jul 2018 **International Conference on Design Computing and Cognition (DCC'18), Politechnico di Milano, Lecco, Italy**
Research paper presenter

Jan 2018 **International Conference on Design Creativity (ICDC), University of Bath, Bath, UK**
Research paper presenter

Jan 2018 **International Design Workshop, MIT Computation Group and UAI Design Lab, MISTI-Chile Funded Program**
Workshop co-organizer

Jul 2016 **International Conference on Design Computing and Cognition (DCC'16), Northwestern University, Chicago, USA**
Selected workshop presenter

SERVICE

Reviewing
Environment and Planning B: Urban Analytics and City Science (2019-2021)
Artificial Intelligence for Eng. Design, Analysis and Manufacturing (2019-2021)
Nexus Network Journal (2018-2019)
Design Computing and Cognition (DCC Conference Series) (2018-2022)

2021 **Graduate Admissions Committee** (Member), MSc & PhD in Computation, MIT
2018-2020 **Cabinet Representative** (PhD), Architecture Student Council (ASC), MIT
2015-2021 **Interdepartmental Subjects Listing Contributor**, Department of Architecture, MIT

Organization
Co-organizer, *4.583 Forum in Computation*, MIT Computation Group, Lecture series with invited speakers in topical areas including Computational Design, HCI, Web Development, Machine Learning. Fall/Spring 2017/2018

Volunteer Instructor, Development of a Summer Course "Arithmetic with Shapes" for K12 students from the Boston area. MIT Educational Studies Program (ESP), July-August 2017.

Mentoring & Advicing
Graduate (MArch, SMArchS) students from the MIT Department of Architecture
Undergraduate (BSc) students from the MIT Departments of Mathematics and EECS
List of Names available upon request.

OUTREACH & OTHER ACTIVITIES

Invited Critic
Massachusetts Institute of Technology, Georgia Institute of Technology, Wenworth Institute of Technology, Boston Architectural College, National Technical University of Athens, Aristotle University of Thessaloniki

Membership
Association for Computing Machinery
Association for Computer-Aided Design in Architecture
American Society for Aesthetics

Pedagogical Training
Implicit Bias in Admissions Processes, MIT Institute Community and Equity Office, 2021
Kaufman Teaching Certificate Program, MIT Teaching + Learning Lab, 2018

Computer Skills
Proficiency in Languages: Python, Processing/Java, TypeScript/HTML, LaTeX
Design Software: Adobe Suite, Autodesk Rhino/Grasshopper, Autocad, 3DSMax

Languages
Greek (Native)
English (Fluent)
Armenian (Conversational, Mother's Language)
German (Beginner)

Other
- Semi-professional electronic music producer and performer. Discography (2009-2015): 4 personal EPs, multiple remixes for other artists, appearances in 5 music compilations (Record releases in Greece, Italy, Norway, Germany)
- MIT Tennis Club