İlke Demir

Curriculum Vitae - December 2018

ilke.demir@oculus.com
http://research.fb.com/people/demir-ilke
http://www.cs.purdue.edu/homes/idemir

Research Interests

- ◇ Geometry processing, shape understanding, 3D deep learning, and generative methods
- ◇ Inverse and forward procedural modeling approaches for urban modeling and 3D reconstruction
- ◇ Machine learning for satellite image understanding and spatial computing

Education

Purdue University, West Lafayette, IN, USA
Ph.D., Computer Science (Advisor: Daniel Aliaga) *2010 - 2016*
M.Sc., Computer Science
Middle East Technical University, Ankara, Turkey
B.Sc., Computer Engineering (high honor student) *2006 - 2010*
Minor in Electrics and Electronics Engineering *2007 - 2010*
Ankara Ataturk Anatolian High School, Ankara, Turkey *(Graduation: 5.00/5.00)* *2003 - 2006*

Work Experience

Facebook - Oculus/AML - *Postdoctoral Research Scientist* (Advisor: Ramesh Raskar) *Dec 2016 - ...*
- ◇ User comfort and behavior analysis for varifocal headsets and machine learning in VR.
- ◇ 3D reconstruction and deep learning approaches for satellite image understanding.
- ◇ Extracting maps and urban information using neural networks and computer vision.

Dept. of Computer Science, Purdue University - *Graduate Research Assistant* *Jan 2011 - Dec 2016*
- ◇ Inverse procedural modeling of urban models, computational geometry for proceduralization and fabrication, UrbanVision Project, 3D urban reconstruction and modeling.

PIXAR Animation Studios - *Infrastructure Software Engineering Intern* *June 2015 - Jan 2016*
- ◇ Maintaining the integrity of studio, implementing new features, developing a build system.

Dept. of Computer Engineering, METU - *Student System Administrator* *Jan 2008 - June 2010*
- ◇ Responsible for software and hardware maintenance of labs, system consistency and fixing network problems. (UNIX and Windows systems)

Dept. of Computer Engineering, METU - *Student Teaching Assistant* *Sept 2007 - Jan 2008*
- ◇ Responsible for labs, exams, and assignments for CEng230 - Introduction to C Programming.

Havelsan Inc. - Software House of Turkey - *Software Engineering Intern* *July - Sept 2009*
- ◇ Joint Task Force Simulation: Developing i18n and logging tools, working as test engineer.
- ◇ Artillery Forward Observer Simulator: Design and implementation of GUI and controllers.

KOVAN Research Lab, METU - Robotics Lab - *Research Intern* *June - Sept 2008*
- ◇ Braitenberg's Vehicles Simulator and Rossi Project: Working on iCub configuration files.

Kapadokya Software - *Author and Editor* *Dec 2007 - April 2008*
- ◇ Pardus Educator's Handbook: Writing/editing the book that trains educators of Pardus.

Awards & Honours

Industry Distinguished Lecturer,	*IEEE GRSS*	*2018*
Fellow,	*IPAM - UCLA*	*2018*
CMW Travel Grant,	*CRA-W*	*2018*
Best Paper Award,	*CVPR - EarthVision Workshop*	*2017*
Spring Travel Grant,	*Purdue WISP - College of Science*	*2017*
Grace Hopper Celebration Travel Grant,	*Purdue Computer Science Dept.*	*2012 - 2014, 2016*
Google I/O Travel Award,	*Anita Borg Institute*	*2015, 2016*
Women in Shape Workshop Travel Funding,	*AWM - NSF*	*2016*
Travel Award,	*CVPR - WiCV*	*2016*
Bilsland Dissertation Fellowship,	*Purdue Graduate School*	*2016*
CSESC '16 Best Poster Award,	*Purdue SIAM*	*2016*
Doctoral Consortium Travel Award,	*ICCV*	*2015*

Project Tango Build-An-App Contest Best Proposal,	*Google*	*2015*
GHC Scholarship for Grace Hopper Celebration,	*Anita Borg Institute*	*2015*
Global Ambassador Recruitment Travel Grant,	*Purdue Graduate Admissions*	*2014*
CRA-W Grad Cohort Travel Scholarship,	*CRA-W*	*2011, 2014*
Best Reviewer Award,	3^{rd} *Computer Science Student Workshop*	*2012*
Admission to several MSc and PhD programs,	Penn State, McGill, TU/E, UF...	*2010*
Best Compiler Award,	7^{th} *Traditional Compiler Contest, METU*	*2010*
Dean's High Honor (7 terms), Honor Roll (1 term),	*METU*	*2006 - 2010*
Finalist,	*"Innovation Tour 2007" project competition*	*2007*
Ranked 1265^{th} among 1.8 million participants,	*University Entrance Exam (OSS)*	*2006*
METU Physics Contest Student,	*AAAL*	*2006*
High School Representative,	*TUBITAK National Olympiads - Math & CS*	*2004 - 2006*
Ranking 1^{st} place among the province,	*MEB Level Determination Exam*	*2003*
Bronze medal,	*TUBITAK National Olympiads in Math*	*2003*

Journal Publications

- ◇ **İlke Demir** and Daniel G. Aliaga. 2018. Guided Proceduralization: Optimizing Geometry Processing and Grammar Extraction for Architectural Models. *Computers & Graphics*. Volume 74, pages 257-267.
- ◇ **İlke Demir**, Daniel G. Aliaga, Bedrich Benes. 2018. Near-Convex Decomposition and Layering for Efficient 3D Printing. *Additive Manufacturing*. Volume 21, pages 383-394.
- ◇ **İlke Demir**, Forest Hughes, Aman Raj, Kaunil Dhruv, Suryanarayana M. Muddala, Sanyam Garg, Barrett Doo, and Ramesh Raskar. 2018. Generative Street Addresses from Satellite Imagery. *ISPRS International Journal of Geo-Information IJGI*. Volume 7(3), Article 84, 22 pages.
- ◇ **İlke Demir**. 2017. A Generalized Proceduralization Framework for Urban Models with Applications in Procedural Modeling, Synthesis, and Reconstruction. *Doctoral dissertation*. Purdue University, West Lafayette, IN.
- ◇ Daniel G. Aliaga, **İlke Demir**, Bedrich Benes, and Michael Wand. 2016. Inverse Procedural Modeling of 3D Models for Virtual Worlds. In *ACM SIGGRAPH 2016 Courses* (SIGGRAPH '16). Article 16, 316 pages.
- ◇ **İlke Demir**, Daniel G. Aliaga, and Bedrich Benes. 2015. Coupled Segmentation and Similarity Detection for Architectural Models. *ACM Trans. Graph. (ToG)*, also on SIGGRAPH '15. Volume 34 (4), Article 104, 11 pages.
- ◇ Ignacio Garcia-Dorado, **İlke Demir**, and Daniel G Aliaga. 2013. Automatic Urban Modeling using Volumetric Reconstruction with Surface Graph Cuts. *Computers & Graphics*. Volume 37(7), pages 896-910.

Conference Publications

- ◇ **İlke Demir**, Guan Pang, and Jing Huang. 2019. A Computer Vision Perspective on Analyzing and Synthesizing Geospatial Data. *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*.
- ◇ Umur A. Ciftci and **İlke Demir**. 2019. FakeCatcher: Detection of Synthetic Portrait Videos using Biological Signals. *arXiv preprint*, arXiv:1901.02212.
- ◇ **İlke Demir** and Ramesh Raskar. 2018. Addressing the Invisible: Street Address Generation for Developing Countries with Deep Learning. *Thirty-second Conference on Neural Information Processing Systems (NeurIPS) Workshop Proceedings, Machine Learning for the Developing World*. Dec 2018.
- ◇ **İlke Demir**, Krzysztof Koperski, David Lindenbaum, Guan Pang, Jing Huang, Saikat Basu, Forest Hughes, Devis Tuia, and Ramesh Raskar. 2018. DeepGlobe 2018: A Challenge to Parse the Earth through Satellite Images. *IEEE Intl. Conf. on Comp. Vision and Pattern Recognition (CVPR) Workshops*. Salt Lake City, UT, 2018, pp. 1-8.
- ◇ **İlke Demir**. 2018. A Holistic Framework for Addresing the World using Machine Learning. *IEEE Intl. Conf. on Comp. Vision & Pattern Recognition (CVPR) Workshops*. Salt Lake City, UT, 2018, pp. 16-19.
- ◇ **İlke Demir**. 2017. Inverse Procedural Modeling for 3D Urban Models. *Grace Hopper Celebration of Women in Computing Conference* (GHC '17). Orlando, FL, USA. (peer-reviewed oral presentation)
- ◇ **İlke Demir**, Forest Hughes, Aman Raj, Kleovoulos Tsourides, Divyaa Ravichandran, Suryanarayana Murthy, Kaunil Dhruv, Sanyam Garg, Jatin Malhotra, Barrett Doo, Grace Kermani, and Ramesh Raskar. 2017. Robocodes Towards Generative Street Addresses from Satellite Imagery. *IEEE Intl. Conf. on Comp. Vision and Pattern Recognition (CVPR) Workshops*. Honolulu, HI, 2017, pp. 1486-1495.
- ◇ **İlke Demir**. 2017. On Generalized Proceduralization Approaches for Urban Data. *IEEE Intl. Conf. on Comp. Vision and Pattern Recognition (CVPR), Women in Comp. Vision Workshop* (WiCV '17).
- ◇ **İlke Demir**, Daniel G. Aliaga, and Bedrich Benes. Proceduralization of Urban Models. 25^{th} *IEEE International Conference on Signal Processing and Applications* (SIU '17). Antalya, Turkey, pp. 1-4.

◇ **İlke Demir**, Daniel G. Aliaga, and Bedrich Benes. 2016. Proceduralization for Editing 3D Architecture. In *Proc. of the 2016 International Conference on 3D Vision* (3DV '16). Stanford, CA, 2016, pp. 194-202.

◇ **İlke Demir**, Daniel G. Aliaga, and Bedrich Benes. 2016. Procedural Editing of 3D Building Point Clouds. *IEEE Intl. Conf. on Comp. Vision and Pattern Recognition (CVPR), Women in Comp. Vision Workshop* (WiCV '16).

◇ **İlke Demir**, Daniel G. Aliaga, and Bedrich Benes. 2015. Procedural Editing of 3D Building Point Clouds. In *Proceedings of the 2015 IEEE International Conference on Computer Vision (ICCV)* (ICCV '15). 2147-2155.

◇ **İlke Demir**. 2015. Proceduralization of Urban Models. 2015. *Grace Hopper Celebration of Women in Computing Conference* (GHC '15). Houston, TX, USA. (peer-reviewed oral presentation)

◇ **İlke Demir**, Daniel G. Aliaga, and Bedrich Benes. 2014. Proceduralization of Buildings at City Scale. In *Proc. of the 2014 International Conference on 3D Vision* (3DV '14), Vol. 1., 456-463.

Selected Projects

Machine Learning for VR, *Oculus - Facebook, Inc.* *2018 - ...*
◇ Analysis of various tracking data in VR, developing deep learning models for immersive experiences.

3D Deep Learning for Shape Abstraction, *WiSH3 (multiple collaborations)* *2018 - ...*
◇ Evaluation of 3D representations for learning topological and geometric shape understanding.

DeepGlobe, *Applied Machine Learning (AML) - Facebook, Inc.* *2017 - ...*
◇ Geometric and semantic information extraction from satellite images using deep neural networks.

Robocodes, *Facebook, Inc.* *2016 - 2017*
◇ Generative schemes for mimicing human settlements, using ML/CV on satellite images.

Geometry Processing, *CGVLab, CS, Purdue University* *2013 - 2018*
◇ Automatic segmentation and labeling algorithms for proceduralization and computational fabrication.
◇ Several optimization approaches for efficient and constrained decomposition.

Proceduralization / Inverse Procedural Modeling, *CGVLab, CS, Purdue University* *2012 - 2018*
◇ An automatic framework to generate grammars from various types of 3D urban models, prototyping an interactive system; for editing, completion, style transfer, and structure preservation.
◇ Compression and theoretical miminal descriptor search for proceduralization systems.

UrbanVision, *CGVLab, CS, Purdue University, in coordination with UC Berkeley* *2011- 2012*
◇ A software-based simulation system for supporting planning and analysis of urban development at scales ranging from large metropolitan areas to individual neighborhoods.
◇ Complete 3D dynamic city models including procedural buildings, vegetation, traffic, pedestrians, and other urban details, also explorable on a multi-touch gesture interface.

3D Construction Quality Analyzer, *IdeaLab, CGT, Purdue University* *Oct. 2010 - May 2011*
◇ An interdisciplinary project using computer vision in automation of construction management.

TRASTRAPS, *Final Design Project at METU in coordination with ASELSAN Inc.* *Sept 2009 - June 2010*
◇ An HLA-Based Warfare Simulator with both 2D and 3D graphics, battlefield configuration, intelligent agents, sound effects, and first person, map navigation and replay modes.

Hospital Management Database System, *Database Systems Course Project* *Spring 2010*
◇ Modeling the data flow and implementing the database system of a theoretical hospital.

3D Farmville World, *Computer Graphics Course Project* *Fall 2009*
◇ Creating 3D version of Farmville, with less functionality but better graphics and object rendering.

Compiler for C♭, *Award Winning Language Processors Course Project* *Fall 2009*
◇ Writing lexer, parser, beautifier, tree constructor and assembly generator of a C-like language, improving old features of C.

Braitenberg's Vehicles Simulator, *KOVAN Research Lab, METU* *Summer 2008*
◇ Implementing behavioral robot models introduced by Valentino Braitenberg with all functionality, new species, and interface to design new behaviors.

Contribution to Pardus, *Linux Working Group, METU* *2007-2008*
◇ Packaging, coding and patching of some applications to Pardus, a linux distro founded by Tubitak.

CENGi - Wireless Internet Access Interface, *CEng, METU* *Fall 2007*
◇ Design and implementation of department's wireless access user interface.

Service Experience

Workshop Chair, *Deep Learning for Geometric Shape Understanding - CVPR* *2019*
Research Network Committee, *WiSh* *2019*
Organizing Committee, *SUMO Challenge - CVPR* *2019*
Organizing Committee, *EarthVision 2019 - CVPR* *2019*

Co-editor, *Learning and Optimization Methods for Shape Abstractions - Springer*	*2018*
Co-editor, *SI on Geospatial Modeling and Visualization - Big Earth Data Journal*	*2018*
Advisory Board, *SUMO Challenge - ACCV*	*2018*
Research Group Lead, *Women in Shape Modeling - WiSH3*	*2018*
Workshop Chair, *DeepGlobe 2018 Satellite Challenge - CVPR*	*2018*
Organizing Committee, *WiCV 2018 - CVPR*	*2018*
Communities Committee, *GHC*	*2015, 2017*
General Representative, *Turkish Women in Computing - Anita Borg Institute*	*2014 - ...*
GHC/ABI LinkedIn Group Manager, *Anita Borg Institute*	*2014 - ...*
Performance Team Coordinator, *Purdue Salsa Club*	*2013 - 2015*
Communities Volunteer, *GHC*	*2013 - 2014*
Treasurer, *Purdue Turkish Student Association*	*2013 - 2014*
Publication Chair, *Computer Science Student Workshop '13*	*2013*
Global Ambassador, *Purdue University Graduate Admissions*	*2012 - 2016*
President of the Board, *Computer Club, METU*	*2009 - 2010*
Editor-in-Chief, *e-Bergi*	*2007 - 2011*
Program Committee Chair, *BILMOK '09*	*2009*
Board Member, *Computer Club, METU*	*2008 - 2009*

Reviewer/Program Committee

Eurographics/Computer Graphics Forum
Computers & Graphics (Elsevier)
IEEE Computer Vision and Pattern Recognition
IEEE CVPR - WiCV, DeepGlobe, EarthVision
Remote Sensing (MDPI)
Living Planet Symposium (ESA)
Grace Hopper Celebration of Women in Computing
IEEE Transactions on Geoscience and Remote Sensing
IEEE Computer Graphics and Applications
Neurips - WiML
IEEE Geoscience and Remote Sensing Letters
ISPRS International Journal of Geo-Information
IEEE Journal of Selected Topics in Earth Observation and Remote Sensing
Computer Science Student Workshop

Invited Talks, Presentations, and Press

◇ "On the Importance of Shape Representations for Deep Learning", **AWM Research Symposium**. April 2019. (Invited)
◇ "Geospatial Machine Learning for Urban Development", **MLConf**, San Francisco, CA. Nov 2018. (Oral)
◇ "Maps, Urban Data, and Geocoding in Graphics", **SIGGRAPH '18**, Vancouver, BC, Canada. Aug 2018. (BoF)
◇ "Generative Representations of the World", **SIAM Annual Meeting**, Portland, OR. July 2018. (Oral)
◇ "WiCV at CVPR", **Computer Vision News**. July 2018. (Press)
◇ "A Holistic Framework for Addressing the World using ML", **CVPR, WiCV '18**, Salt Lake, UT. June 2018. (Poster)
◇ "Generative Street Addresses from OSM ", **GIS Day @ Standford**, Stanford, CA. Nov 2017. (Lightning)
◇ "Robocodes Towards Generative Street Addresses', **Bay Area Vision Meeting**, Menlo Park, CA. Nov 2017. (Poster)
◇ "Generative Street Addresses from OSM ", **SOTM US '17**, Boulder, CO. Oct 2017. (Oral)
◇ "Inverse Procedural Modeling for 3D Urban Models ", **GHC '17**, Orlando, FL. Oct 2017. (Oral)
◇ "Maps, Urban Data, and Geocoding in Graphics", **SIGGRAPH '17**, Los Angeles, CA. Aug 2017. (BoF)
◇ "Robocodes Towards Generative Street Addresses', **CVPR, EarthVision**, Honolulu, HI. July 2017. (Oral & Poster)
◇ "On Proceduralization Approaches for Urban Data", **CVPR, WiCV '17**, Honolulu, HI. July 2017. (Poster)
◇ Interview, **CVPR Daily**, Honolulu, HI. July 2017. (Press)
◇ "Proceduralization of Urban Models", **SIU '17**, Antalya, Turkey. May 2017. (Oral)
◇ "Proceduralization of Urban Models", **Eurographics '17 - DC**, Lyon, France. April 2017. (Oral & Poster)
◇ "Proceduralization for Editing 3D Architecture", **Intl. Conf. on 3D Vision (3DV)**, Stanford, CA. Oct 2016. (Poster)
◇ "Inverse Procedural Modeling of 3D Models for Virtual Worlds", **SIGGRAPH**, Anaheim, CA. July 2016. (Course)
◇ "Procedural Editing of Building Point Clouds", **CVPR, WiCV '16**, Las Vegas, NV. June 2016. (Poster)
◇ "Procedural Editing of Building Point Clouds", **CSESC**, Purdue University. April 2016. (Oral & Poster)
◇ "Procedural Editing of Building Point Clouds", **ICCV**, Santiago, Chile. Dec 2015. (Poster)
◇ "Proceduralization of Urban Models", **Grace Hopper Celebration (GHC)**, Houston, TX. Oct 2015.(Oral)
◇ "Coupled Segmentation and Similarity Detection for Architectural Models", **SIGGRAPH**. Aug 2015. (Oral)
◇ "Proceduralization of Buildings at City Scale.", **CSESC**, Purdue University, March 2015. (Poster)
◇ "Urban Proceduralization for Various Environments", **Seminar for CEng**, METU, Ankara, Turkey. Dec 2014. (Oral)
◇ "Proceduralization of Buildings at City Scale", **Intl. Conf. on 3D Vision (3DV)**, Tokyo, Japan. Dec 2014. (Poster)

◇ "3D Process Quality Analyzer", **Faculty Convocation**, College of Technology, Purdue University. April 2011. (Poster)
◇ "Academic Career Planning Abroad", **"What's Up in Informatics World?" Conf.**, METU. April 2010. (Panel)

Skills & Involvement

General: Good understanding of algorithms, data structures, programming paradigms, and design patterns.
Main programming languages: C, C++, Python
Coded several projects in: Java, Bash, SQL, MATLAB
Coded at least one project in: Assembly, Haskell, Scheme, XHTML, CSS, Prolog, PHP, XML
Tools & Applications: GNU tools (gcc, gdb), Eclipse, Netbeans, XCode, Sublime, vim, LaTeX, Qt, OpenCV, PCL, OpenGL, Glut, Glui, PQLabs SDK, OpenNI, Nite, wxWidgets, JRE-AWT, JSP, JDBC, Tomcat, SVN, P4, MySql, Visual Studio, Sublime, Bugzilla, Traction, grok, Meshlab, 3DS Max, Maya, Virtuozzo, Dashing, Atom, Nuclide.
Member of ACM, IEEE, Eurographics, ACM-W, CRA-W, Systers, WiML, AWM - WiSh, Women TechMakers, WiMLDS.

Personal

Languages: English - Advanced, Spanish - Intermediate, Turkish - Native
Music: *Playing clarinet, classic guitar, and ukulele. Given seven concerts with clarinet, with orchestra.*
Hobbies: *Social salsa & bachata dancer, instructor, and performer. Playing RPG and adventure games, and DOTA.*