

# Masaki Nakada, PhD

## Research Interests

- Computer Graphics** Physics-based modeling and animation, Biomechanical human simulation, Neuromuscular control, Sensorimotor control, Shape design, Real-time optimization, Artificial life
- Computer Vision** Biomimetic perception, Active vision and sensorimotor control, Object recognition, Semantic scene understanding, 3D object reconstruction, Object localization
- Machine Learning** Neural networks, Deep learning, Reinforcement learning, Evolutionary learning, Bayesian networks, Statistical data analysis

## Academic Background

- 2011–2017 **Ph.D., 2017, Computer Science**, *University of California, Los Angeles*.  
Advisor: Professor Demetri Terzopoulos  
Thesis: Deep Learning of Neuromuscular and Sensorimotor Control with Biomimetic Perception for Realistic Biomechanical Human Animation
- 2009–2011 **M.S., 2011, Pure and Applied Physics**, *Waseda University, Tokyo, Japan*.  
Advisor: Professor Shigeo Morishima  
Thesis: Bipedal robot balancing with reinforcement learning
- 2005–2009 **B.S., 2009, Applied Physics**, *Waseda University, Tokyo, Japan*.  
Advisor: Professor Shigeo Morishima  
Thesis: Grid based statistical database for 3D automobile shape design

## Professional Experience

- 2018 **Postdoctoral Scholar**, *UCLA Computer Graphics & Vision Laboratory*, Computer Science Department, University of California, Los Angeles.
- Apr–Aug 2011 **Software Engineer**, *Intel Corporation*, Tokyo, Japan.
- Summer 2010 **Software Engineer**, *Barclays Capital*, Tokyo, Japan.
- Spring 2010 **Sales Marketing in Fixed Income, Equity Derivatives**, *J.P. Morgan*, Tokyo, Japan.
- Fall 2007 **Software Engineer**, *Nokia Corporation*, Tokyo, Japan.
- Spring 2007 **Software Engineer**, *Ericsson Corporation*, Tokyo, Japan.

## Honors and Awards

- March 2022 **Best Poster Award at International Symposium on Intelligence Design**, held at University of Tokyo.
- January 2019 **Institute for Digital Research and Education Postdoctoral Scholar Award**, held at UCLA.
- August 2018 **SIGGRAPH 2018 Thesis Fast Forward**, Honorable mention.
- 2011–2016 **Japan Student Services Organization Fellowship**, held at UCLA.
- 2009–2010 **Rotary Ambassadorial Fellowship**, held at UCLA.
- 2009–2011 **Itoh Foundation Fellowship for Master Degree**, held at Waseda University.
- 2009–2010 **Entrepreneurship Foundation Fellowship**, held at Waseda University.

- 2005–2009 **Itoh Foundation Fellowship for Bachelor Degree**, held at Waseda University.  
2002–2005 **Aoi Foundation Fellowship for High School**.

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## Publications

- 2022 **DeepFoids: Adaptive Bio-Inspired Fish Simulation with Deep Reinforcement Learning**.  
Y. Ishiwaka \*, X. Zeng \*, S. Ogawa, D. Westwater, T. Tone, M. Nakada  
In *NeurIPS 2022 Conference*, U.S.A., December, 2022
- 2022 **Motion Transition and Tiredness Controllers for Deep Reinforcement Learning based Character Animation**.  
A. Hadj-Chaib, M. Nakada (\*\*Best Poster Award)  
In *International Symposium on Intelligence Design 2022 Conference*, U.S.A., December, 2022
- 2021 **Foids: Bio-Inspired Fish Simulation for Generating Synthetic Datasets**.  
Y. Ishiwaka \*, X. Zeng, M. Eastman, S. Kakazu, S. Gross, R. Mizutani, M. Nakada \*  
In *ACM SIGGRAPH Asia 2021 Conference*, Japan, December, 2021
- 2021 **Neuromuscular Control of the Face-Head-Neck Biomechanical Complex With Learning-Based Expression Transfer From Images and Videos**.  
X. Zeng, S. Dwarakanath, W. Lu, M. Nakada, D. Terzopoulos  
In *International Symposium on Visual Computing 2021*, U.S.A., August, 2021
- 2021 **Facial Expression Transfer from Video Via Deep Learning**.  
X. Zeng, S. Dwarakanath, W. Lu, M. Nakada, D. Terzopoulos  
In *The 20th Annual Symposium on Computer Animation 2021*, U.S.A., May, 2021
- 2021 **Biomimetic Active Vision in a Simulated Human**.  
M. Nakada, H. Chen, A. Lakshmipathy, D. Terzopoulos  
In *International Conference on Pattern Recognition 2021*, Italy, January, 2021
- 2020 **Multimodal Post Attentive Profiling for Influencer Marketing**.  
S. Kim, JY. Jiang, M. Nakada, J. Han, W. Wan  
In *Proceedings of The Web Conference 2020.*, Taipei, Taiwan, April, 2020
- 2021 **Deep Learning of Neuromuscular and Visuomotor Control of a Biomimetic Simulated Humanoid**.  
M. Nakada, T. Zhou, H. Chen, A. Lakshmipathy, D. Terzopoulos  
In *IEEE Robotics and Automation Letters Journal*, February, 2020
- 2019 **Biomimetic Eye Modeling and Deep Neuromuscular Oculomotor Control**.  
M. Nakada, A. Lakshmipathy, T. Zhou, X. Ling, H. Chen, D. Terzopoulos  
*ACM SIGGRAPH Asia 2019 Conference*, Brisbane, Australia, November 2019.
- 2018 **Fast and Scalable Position-Based Layout Synthesis**.  
T. Tomer, A. Litteneker, N. Duncan, M. Nakada, C. Jiang, L. Yu, D. Terzopoulos  
In *IEEE Transactions on Visualization and Computer Graphics (TVCG) 2018*.
- 2018 **Biomimetic Perception Learning for Human Sensorimotor Control**.  
M. Nakada, H. Chen, T. Zhou, D. Terzopoulos  
In *International Symposium on Visual Computing (ISVC)*, Las Vegas, Nevada, December 2018.
- 2018 **Deep Learning of Biomimetic Visual Perception for Virtual Humans**.  
M. Nakada, H. Chen, D. Terzopoulos  
In *ACM Symposium on Applied Perception (SAP)*, Vancouver, Canada, August 2018.
- 2018 **Deep Learning of Biomimetic Sensorimotor Control for Biomechanical Human Animation**.  
M. Nakada, T. Zhao, H. Chen, T. Weiss, D. Terzopoulos  
In *ACM Transactions on Graphics*, **37**(4):1–14, August 2018. (Proceedings of ACM SIGGRAPH 2018, Vancouver, Canada, August 2018)

- 2018 **Learning Biomimetic Perception for Human Sensorimotor Control.**  
M. Nakada, H. Chen, D. Terzopoulos  
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshop on Mutual Benefits of Cognitive and Computer Vision*, Salt Lake City, UT, June 2018, pp. 1–6
- 2017 **Automated Layout Synthesis and Visualization From Images of Interior or Exterior Spaces.**  
M. Nakada, T. Weiss, D. Terzopoulos  
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshop on Vision Meets Cognition*, Honolulu, HI, July 2017, pp. 41–47
- 2017 **AcFR: Active Face Recognition Using Convolutional Neural Networks.**  
M. Nakada, H. Wang and D. Terzopoulos.  
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshop on Vision Meets Cognition*, Honolulu, HI, July 2017, pp. 35–40
- 2015 **Deep Learning of Neuromuscular Control for Biomechanical Human Animation.**  
M. Nakada and D. Terzopoulos.  
In *Advances in Visual Computing, Lecture Notes in Computer Science, Vol. 9474*, G. Bebis et al. (eds.), Springer-Verlag, Berlin, 2015, pp. 339–348 (Proceedings of the International Symposium on Visual Computing (ISVC), Las Vegas, NV, December 2015)
- 2010 **Learning Arm Motion Strategies for Balance Recovery of Humanoid Robots.**  
M. Nakada, B. Allen, S. Morishima and D. Terzopoulos.  
*2010 International Symposium on Learning and Adaptive Behavior in Robotic Systems, 2010 International Conference on Emerging Security Technologies*, Canterbury, UK, September, 2010, pp. 165–170
- 2009 **Database and GUI Design for Automobile Shape Design.**  
M. Nakada, T. Hayakawa, S. Sugimoto and S. Morishima.  
In Proceedings of the 2009 IEICE General Conference, Ehime, Japan, March 2009, pp. 109.

## Invited Talks

### Academic

- Foids and DeepFoids: Bio-Inspired Fish Simulation and Physics Based Environment Simulation.**
- 2022 Invited Talk at Johns Hopkins in department of electrical and computer engineering, Baltimore, U.S.A., October 26, 2022.
- Bio-Inspired Fish Simulation.**
- 2022 International Symposium on Intelligence Design, Tokyo, Japan, March 14, 2022.
- Deep Learning of Neuromuscular and Sensorimotor Control with Biomimetic Perception for Realistic Biomechanical Human Animation.**
- 2019 IDRE Early Career Research Day 2019, Los Angeles, U.S.A., November 20, 2019.
- Artificial Life: How to Simulate a Human.**
- 2019 Terasaki Foundation 2019, Los Angeles, U.S.A, May 11, 2019.
- Artificial Life: How to Simulate a Human.**
- 2018 Southern California Japanese Scholars Forum (SCJSF) 2018, Los Angeles, U.S.A, October 14, 2018.
- Deep Learning of Neuromuscular and Sensorimotor Control with Biomimetic Perception for Realistic Biomechanical Human Animation.**
- 2018 ACM SIGGRAPH Thesis Fast Forward 2018, Vancouver, Canada, August 12, 2018.
- Deep Learning of Neuromuscular Control for Biomechanical Human Animation.**

2016 The 2016 Electrical and Computer Engineering Annual Research Review, Los Angeles, U.S.A., February 19, 2016.

### *Other*

**Foids and DeepFoids: Bio-Inspired Fish Simulation and Physics Based Environment Simulation.**

2022 Invited Talk at Meta for AI/ML team, Menlo Park, U.S.A., September 20, 2022.

**Current A.I. Research and Advanced Applications in Industry.**

2018 Invited talk about the state of the art A.I. research in academic and practical use cases in industry for the 120 executives from top companies, San Jose, December 14, 2018

**Advice About Academics, Career and Life With Experiences in the USA and Japan**

2019 Invited talk at UCLA for Masayoshi Son Foundation, Tokyo, Japan, August 25, 2019

2019 Invited talk at UCLA for Toritsu Tachikawa High School, Tokyo, Japan, July 26, 2019

2018 Invited talk at UCLA for Hakuyou High School, Tokyo, Japan, August 8, 2018

2018 Invited talk at UCLA for Kawagoe High School, Tokyo, Japan, March 29, 2018

2016 Invited talk at UCLA for Tokyo Noudai Nikou High School, Tokyo, Japan, November 22, 2016

2016 Invited talk at UCLA for Otemae High School, Tokyo, Japan, July 22, 2016

2016 Invited talk at UCLA for Jutoku High School, Tokyo, Japan, July 15, 2016

**Advice About Academics and Life at UCLA With Experiences in PhD Studies**

2013 Graduate panel for new incoming students, UCLA, September 16, 2013

**Hot Markets, Language Skills, and Emerging Industries: Students; Perspectives**

2012 A Dialogue on Russia, St. Petersburg, Russia, October 19, 2012.

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## Reviewing

2022 **ACM Transaction of Graphics (TOG) 2022.**

2021 **ACM Eurograph 2021.**

2020 **ACM Transaction of Graphics (TOG) 2020.**

2019 **ACM SIGGRAPH Asia 2019.**

2019 **IEEE Access 2019.**

2019 **ACM SIGGRAPH 2019.**

2018 **IEEE Transactions on Neural Networks and Learning Systems 2018.**

2018 **ACM Eurograph 2018.**

2018 **ACM SIGGRAPH Asia 2018.**

2018 **International Conference on Pattern Recognition (ICPR) 2018.**

2011 **Motion In Games (MIG) 2011.**

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## Teaching Experience

Winter, Spring 2017 **Teaching Assistant for *Introduction to Computer Science II*, UCLA.**

Object-oriented software development. Abstract data type definition and use. Overloading, inheritance, polymorphism. Object-oriented view of data structures: stacks, queues, lists. Algorithm analysis. Trees, graphs, and associated algorithms. Searching and sorting.

Fall 2017 **Teaching Assistant for *Introduction to Computer Science I*, UCLA.**

Introduction to computer science via theory, applications, and programming. Basic data types, operators and control structures. Input/output. Procedural and data abstraction. Introduction to object-oriented software development. Functions, recursion. Arrays, strings, pointers. Abstract data types, object-oriented programming. Examples and exercises from computer science theory and applications.

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## Mentoring

- 2020 **Xiao Zeng**, *PhD, CS*, Biomechanical Human Face Simulation.
- 2020 **Santosh Yadav**, *PhD, CS*, Human Activity Recognition.
- 2020 **Deepti Rawat**, *BS, CS*, Human Activity Recognition.
- 2019-2020 **Siyal Sonarkar**, *MS, CS*, Human Activity Classification.
- 2019-2020 **Jianzhi Liu Gupta**, *MS, CS*, 3D Human Pose Estimation.
- 2019-2020 **Xiao Yang**, *BS, CS*, Photo Realistic Rendering for Synthetic Dataset.
- 2019-2020 **Surya Dwarakanath**, *MS, CS*, Human Simulation for Synthetic Dataset.
- 2019 **Vikas Gupta**, *MS, CS*, 3D Human Pose Estimation.
- 2019 **Kevin Chuang**, *BS, CS*, Particle eEffects for AR.
- 2019 **Ian Michael Costello**, *BS, CS*, Particle Effects for AR.
- 2019 **Sarah Gross**, *BS, Computational Biology*, Bio-inspired Muscle Simulation.
- 2018-2019 **Adrien Hadj-Chaib**, *BS, CS*, Deep Reinforcement Learning for Biped Locomotion.
- 2016-2019 **Honglin Chen**, *BS, Math & CS*, Biomimetic Human Vision.
- 2017-2018 **Arjun Lakshmipathy**, *MS, CS*, Neuromuscular Control of a Biomechanical Human Eye.
- 2017-2018 **Dennis Van Ee**, *BS, CS*, Biomechanical Human Ocular Lens Simulation.
- 2018 **Gestina Yassa**, *BS, CS*, Biomimetic Cortical Mapping.
- 2018 **CJ Ordog**, *BS, CS*, Biomimetic Visual Sampling.
- 2018 **Yutiang Zhang**, *MS, CS*, Biomechanical Face Swap.
- 2018 **Xin Ling**, *BS, CS*, Biomechanical Human Eye Rendering.
- 2018 **Dan Fang**, *MS, CS*, Multiple Viewpoint Face Recognition.
- 2018 **Qi Qu**, *MS, CS*, Fine-grained Flower Image Classification using Deep Transfer Learning.
- 2017 **Pranav Sodhani**, *MS, CS*, Face Recognition using Space Variant Sensors.
- 2016 **Han Wang**, *MS, CS*, Active Face Recognition using Convolutional Neural Networks.

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## Intellectual Property

- 2022 **U.S. Provisional Patent Application No. 17875426**, *Information Processing Apparatus and Information Processing method.*
- 2022 **U.S. Patent, Document ID: US 20220262075 A1**, *Deep Learning Of Biomimetic Sensori-motor Control For Biomechanical Model Animation..*

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## Entrepreneurial Activity

- 2019- **Co-founder**, *NeuralX, inc.*  
Motion estimation and analysis with pose analysis (computer vision) and biomechanical model simulation.
- 2016-2018 **Co-founder**, *vuSearch (MJ Style, LLC).*  
Visual search platform for fashion e-commerce and trend analytics.
- 2012-2015 **Co-founder**, *vuPad, LLC.*  
Mobile application for furniture e-commerce and interior design using augmented reality.

### Prizes

- January 2018 **Finalist and 1st Prize winner at The 8th TEEC Cup North American Entrepreneurship Competition in Silicon Valley**, *Awowd, Inc.*  
<http://ucahp.com/en/events/8th-connect/>  
Intelligent self animating character for next generation contents generation. 1st Prize among 500 startups.

- July 2016 **Blackstone Launchpad Startup UCLA Accelerator**, *vuSearch*.  
<https://startupucla.com/accelerator/>  
 One of 9 teams selected from 80 startups at the summer accelerator program.
- April 2014 **Finalist and 5th Prize winner at the Knapp Venture Competition**, *vuPad, LLC*.  
<http://www.anderson.ucla.edu/media-relations/2014/knapp-venture-competition>  
 Mobile application to help consumers purchase furniture using image-based augmented reality.
- February 2014 **Finalist and 8th Prize winner at Rice Business Plan Competition**, *vuPad, LLC*.  
<https://rbpc.rice.edu/>  
 Mobile application to help interior designers and realtors using image-based augmented reality.
- June 2013 **3rd Prize winner at the Microsoft Mobile Hackathon**, *What's Next*.  
 Mobile application to help tourists search for landmarks using location-based augmented reality.
- April 2013 **Finalist and 3rd Prize winner at the Institute for Technology Advancement (ITA) competition**, *vuPad, LLC*.  
<http://www.ita.ucla.edu/previous-winners/>  
 Mobile application to help consumers purchase furniture using image-based augmented reality.
- August 2012 **USA startup representative at SumIT in St. Petersburg, Russia**, *vuPad, LLC*.  
<http://www.global.ucla.edu/outreach/americas/141423>  
 The best startup selected from 25 teams.
- July 2012 **Startup UCLA accelerator**, *vuPad, LLC*.  
<https://startupucla.com/accelerator/>  
 One of 9 teams selected from 70 startups at the summer accelerator program.
- June 2012 **1st Runner-Up at the UCLA Hackathon**, *vuPad, LLC*.  
 Mobile application to help consumers purchase furniture using image-based augmented reality.

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## Media Attention

- January 2018 **China News**, *Awowd Inc.*, <http://www.chinanews.com/gj/2018/01-15/8424411.shtml>.  
 1st Prize winner among 500 startups: Intelligent self-animating characters for next generation content generation.
- August 2012 **Press conference with UCLA Chancellor Gene D. Block at SumIT in Russia**, *vuPad, LLC*, <http://international.ucla.edu/russianflagship/article/128712>.  
 The best startup among 25 teams.

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## Selected Graduate Course Work

**Computer Graphics** Introduction to Computer Graphics  
 Computer Animation  
 Artificial Life for Computer Graphics and Vision

**Machine Learning** Machine Learning Theory  
 Pattern Recognition and Machine Learning  
 Animats-Based Modeling  
 Artificial Intelligence  
 Advanced Computer Vision

**Mathmatics** Advanced Numerical Analysis  
 Advanced Mathmatics  
 Seminar on Advanced Topics in Applied Mathematics  
 Algorithms & Complexity

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## References

1. **Demetri Terzopoulos**  
Distinguished Professor and Chancellor's Professor of Computer Science  
Computer Science Department  
University of California, Los Angeles  
dt@cs.ucla.edu
2. **Joseph Teran**  
Professor of Applied Mathematics  
Department of Mathematics  
University of California, Los Angeles  
jteran@math.ucla.edu
3. **Shigeo Morishima**  
Professor of Applied Physics  
Department of Applied Physics  
Waseda University  
shigeo@waseda.edu