

# Luis Ángel

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임영민

Computer Scientist

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## Education

### PhD candidate in Computer Science

University of California, Santa Barbara (UCSB)  
2018 - Present

### Completed coursework in pursuit of a PhD in Computer Science

University of California, Los Angeles (UCLA)  
2013 - 2016

### Master of science in Computer Science

University of California, Los Angeles  
2010 - 2012

### Bachelor of engineering in Computer Systems

Technological Institute of Ciudad Guzmán (ITCG)  
2003 - 2008

### General baccalaureate · High school diploma

Regional High School of Ciudad Guzmán at Tecalitlán, University of Guadalajara (UDG)  
2000 - 2003

## Languages

**Spanish** Native speaker  
**English** TOEFL IBT 110 points certified  
**Korean** Basic proficiency

## Skills

### Computer graphics

OpenGL and WebGL programming. Computer animation, real-time high-quality rendering, and computational geometry

### Artificial intelligence

Genetic algorithms, machine learning, reinforcement learning, and deep learning (on Tensorflow and Keras)

### Scientific computing and applied mathematics

Matrix analysis and computation, ordinary differential equations, numerical simulation, physics-based simulations in Open Dynamics Engine, image processing, particle systems; MATLAB, C/C++, Python (Pylab, Numpy, Scikit-Learn), and R programming

### Software development

Information systems (database management) and desktop applications programming on C/C++, Java, Visual Basic, Delphi, and Go. Version control systems: GIT and SVN

### Full-stack development and Big Data analytics

Web applications and services programming using PHP, Java Servlets, JSPs, Apache (Tomcat, Lucene, Axis2, ActiveMQ), MySQL, MonetDB, MongoDB, HTML, XML, Javascript (jQuery and plugins), CSS, and Logi Analytics

### Graphic design

Use of Adobe Creative Suite (Dreamweaver, Flash, Photoshop, Illustrator, InDesign) and Corel Draw

### General-purpose software

Use of Windows, Linux (Ubuntu/CentOS), macOS, and MS Office (Word, Power Point, and Excel). Use of IDEs for software development such as IntelliJ IDEA, GoLand, CLion, PyCharm, PHPStorm, Xcode, Visual Studio (Code), Eclipse, and NetBeans

## Professional Experience

### Teaching associate/instructor of record

UCSB. *Introduction to Computational Science* (Winter 2021)

### Teaching assistant

UCSB. Leading discussion sessions and preparing course materials for *Foundations of Database Systems* (Fall 2019), *Problem Solving with Computers I* (Winter 2020), *Introduction to Computer Science* (Spring 2020), and *Introduction to Computational Science* (Fall 2020)

### Graduate student research assistant

CASL at UCSB. Machine Learning and Computational Science researcher, seeking the solution of partial differential equations and the approximation of dynamic interface-geometric properties using deep learning (July - September 2019, and July - September 2020)

### Software engineer and researcher

Inpixon. Front-end developer of *ZoneAware/ZoneDefense* (GPS for the indoors), full-stack developer and project lead of *Visual Workbench* (using Logi Analytics and MonetDB) as part of IPA Studio, and software engineer and researcher of an AI-based device positioning engine (June 2016 - September 2018)

### Web developer consultant

Full-stack developer of the Tecalitlán Tourism Bureau website: [www.tecalitlan.youngmin.com.mx](http://www.tecalitlan.youngmin.com.mx) (April 2016)

### Teaching assistant

UCLA. Leading discussion sessions and preparing course materials for *Mathematical Models and Methods for Computer Science* (Fall 2014, Winter 2016), *Web Applications* (Winter 2015), and *Introduction to Computer Science 1* (Spring 2015)

### Web developer consultant

Villas Camino del Mar resorts. Full-stack developer of company website: [www.villascaminodelmar.com.mx](http://www.villascaminodelmar.com.mx) (2008 - 2016)

### Web developer consultant

Full-stack developer of the web application for the Mexican federal program "Agenda for Municipal Development": [www.agenda.youngmin.com.mx](http://www.agenda.youngmin.com.mx) (2011 - 2015)

### Web application developer and graphic designer

Municipal Government of Tecalitlán, Jalisco, 2012 - 2015 Administration: [www.tecalitlan.gob.mx](http://www.tecalitlan.gob.mx) (2012 - 2013)

## Lecturer

ITCG. *Simulation and Artificial Neural Networks* (Fall 2012)

## Head of the Information Technologies department

Municipal Government of Tecalitlán, Jalisco, 2010 - 2012 Administration. Web application developer and graphic designer of governmental digital image: [www.tecalitlan.gob.mx](http://www.tecalitlan.gob.mx) (2010)

## Web developer

Tourism Bureau, Municipal Government of Tecalitlán, Jalisco, 2007 - 2009 Administration (2009)

## Featured Projects

### A deep learning approach for the computation of curvature in the level-set method

(Preprint) Our approach is based on fitting neural networks to synthetic datasets of pairs of nodal  $\phi$  values and curvatures obtained from circular interfaces immersed in different uniform resolutions. Evaluations with irregular contours, in both uniform and adaptive meshes, show that our deep learning framework is systematically superior to conventional numerical approximations in the  $L^2$  and  $L^\infty$  norms

### NED: Collective named entity disambiguation via personalized Page Rank and context embeddings

A solution to the disambiguation task that combines traditional candidate mapping entity generation and local evaluation with word embeddings and personalized PageRank. The final mapping entities for the given surface forms are obtained by performing a maximal discriminant selection

### Reflective shadow maps

An implementation of Reflective Shadow Maps, together with Percentage-Closer Soft Shadows and Screen-Space Ambient Occlusion for added realism. Our approach works with blurred textures and diffuse 3D objects shaded with the Blinn-Phong Reflectance Model. We have also resorted to Deferred Rendering to achieve interactive rates when RSM and SSAO are enabled

### Precomputed radiance transfer

We render a scene with a 3D object model and a cube-map as lighting source. Our system supports Precomputed Radiance Transfer on shadowed diffuse objects

### WebGL template

A WebGL implementation using JSPs. We employ the `numeric.js` library and other extensions to support drawing cubes, spheres, cylinders, prisms, dots, and paths using the Blinn-Phong reflectance model

### Arthropoda

A physics-based simulation of a biomechanical model of an *Araneous Diadematus* specimen. The spider is able to walk by using the ODE framework for dynamics emulation and OpenGL for rendering

### Lisa

A physics-based simulation of a biomechanical model of a salamander, capable of walking and swimming. The system uses the ODE framework for dynamics computation and OpenGL for rendering

### Disambiguation of named entities in web lists

System that yields the correct mapping for mentioned entities in a list by using simulated annealing. Our application utilizes Wikipedia (as of 2012) as knowledge base to define the metrics and semantics used in the mapping process

### Snow simulation

2D physics-based simulation of snow using the material point method. We emulate the mechanics, viscosity, and composition of snow as the latter is affected by external and internal forces. The system is developed in C++ and OpenGL

### Face classification and generation

MATLAB application that uses singular value decomposition and other

image-processing machinery to classify male and female faces. Further statistical analysis allows to generate random faces given the intensity and geometry features extracted from the training set

### Antarctica: exploring the MAXSON architecture

(Master's degree project) Simulation of an artificial ecosystem where virtual creatures learn to survive by eating food and avoiding poison, and to reproduce in order to maintain the continuity of their species. The agents emulate natural phenomena such as nuptial feeding and male brooding by resorting to a neural-based reinforcement learning

### A symmetry-seeking model for 3D object reconstruction using a mesh of particles

Three-dimensional object reconstruction from 2D input images using a mesh of particles connected by springs. The particle mesh deforms into a target shape as internal forces (elasticity) react to external forces (image, symmetry, and expansion/contraction)

### Auction web service

Web application that implements an auction website using Java, MySQL, Apache (Lucene, Tomcat, and Axis2), Javascript, and AJAX

### Multi-agent simulation using continuum crowds

Crowd simulation where agent behavior resembles fluid motion. The displacement of agents depends on crowd densities at different locations in a discrete environment that represents a potential/velocity field

### Darwinism, Lamarckism, and knowledge exchange among animats

Simulation of an artificial ecosystem where animat creatures learn to survive from two evolutionary perspectives: Darwinism and Lamarckism. Agents have egocentric maps that allow them to acquire and share knowledge about the environment they live in

### Neural model for predicting volcanic events

(Bachelor's degree thesis) Development of a neural net that predicts volcanic eruptions based on current input data and historic information

### Drugstore information system

Stock-management desktop application to control sales, purchases, and product reservations in a drugstore. Our system is written in Delphi and developed with the highest standards in software engineering

## Publications

### Neural model for predicting volcanic events

2008 Jalisco Science and Technology Award

### Neural net model for predicting volcanic events of El Colima

(Poster) 2008 International Congress of Computer Science and Information Technologies

### Processing vulnerability maps data with neural nets

(Poster) 2008 International Congress of Computer Science and Information Technologies

## Presentations and Academic Events

**A talk about computer science:** Regional High School of Ciudad Guzmán at Tecalitlán, UDG (2013)

**A symmetry-seeking model for 3D object reconstruction using a mesh of particles:** Information Technologies National Congress. ITCG (2012)

**A talk about artificial intelligence:** 19th Science and Technology State Week. Jalisco Science and Technology State Council (2012)

**Neural net model for predicting volcanic events of El Colima:** 2008 International Congress of Computer Science and Information Technologies. ITCG (2008)

**Processing vulnerability maps data with neural nets:** 2008 International Congress of Computer Science and Information Technologies. ITCG (2008)

**Participant:** ITESO Eighth Local Programming Contest. ITESO (2007)

**Access system based on phone cards:** 21th National Creativity Event, Regional Stage, 3rd Region. Technological Institute of La Laguna (2006)

**Access system based on phone cards:** 4th Regional Exhibition and Technological Innovation Award. Technological Institute of Morelia (2006)

**Attendee:** 2004 International Congress of Computer Science and Information Technologies. ITCG (2004)

## Fellowships

**Hispanic Scholarship Foundation** scholar (2020 - 2021)

**UC Regents Fellowship** for PhD students at the University of California, Santa Barbara (2018 - 2019)

**CONACyT** "Bicentennial" Mexican fellowship for graduate studies abroad (2010 - 2012)

**PRONABES** fellowship for undergraduate students (2003 - 2008)

## Awards

**First place graduating student from the Computer Systems Engineering Program at his institution in 2008**, by the Mexican National Association of Engineering Schools (June 2009)

**Science and Technology Award, "Early Research" category**, by Jalisco's Science and Technology State Council (February 2009)

**Excellence Medal to the Engineering Student**, by ITCG (September 2008)

**Highest GPA (99.5) in the 2003-2008 Class of the Computer Systems Engineering Program**, by ITCG (September 2008)

**Graduated with honors, (GPA of 99.5), in the 2003-2008 Class of the Computer Systems Engineering Program**, by ITCG (September 2008)

**Satisfactory conclusion of the Networking and Distributed Systems Field in the 2003-2008 Class of the Computer Systems Engineering Program**, by ITCG (September 2008)

**Lead participant in the university program "Peer Tutoring"**, by UDG (July 2003 and July 2002)

**First place in high school academic performance in the 2000-2003 Class**, by UDG (July 2003)

**First place in academic performance of the 4th, 3rd, 2nd, and 1st high school semesters**, by UDG (July 2002, February 2002, July 2001, and January 2001, respectively)