PABLO ZEGERS

pablozegers@gmail.com

Currently

Founder and Research Advisor, Sortbox, Santiago, Chile. Since 07/2017.
Leading a team in charge of building artificial intelligences for the agrotech sector.

Founder and Research Advisor, Anastasia, Santiago, Chile. Since 12/2016.
Leading a team in charge of building artificial intelligences for natural language conversation.

Research Advisor, Webdox, Santiago, Chile. Since 10/2016.
Leading a team in charge of building artificial intelligences for legal text processing.

Education

Ph.D. in Electrical Engineering. The University of Arizona, Tucson, AZ. 02/2002. Dissertation title: "*Some New Results on the Architecture, Training Process, and Estimation Error Bounds for Learning Machines*." Overall GPA 3.73 out of 4.0.

Master of Science in Electrical Engineering. The University of Arizona, Tucson, AZ. 04/1998. Thesis title: "*Speech Recognition Using Neural Networks*." Overall GPA 3.67 out of 4.0.

Ingeniero Civil de Industrias. Pontificia Universidad Católica de Chile, Chile. 12/1992. Thesis title: "*Reconocimiento de Voz Utilizando Redes Neuronales*." Degree obtained with *Maximum Distinction*.

Research Experience

Associate Professor. College of Engineering and Applied Sciences, Universidad de los Andes, Santiago, Chile. 01/2010 to 06/2017.
Research done on artificial intelligence, machine learning, neural networks, artificial vision, information theory, etc.

Research Professor. College of Engineering and Applied Sciences, Universidad de los Andes, Santiago, Chile. 03/2002 to 12/2009.
Research done on artificial intelligence, machine learning, neural networks, information theory, etc.

Research Assistant, Electrical and Computer Engineering Department, The University of Arizona, Tucson, AZ. 05/2001 to 12/2001.
Research done on the measurement of the mutual information in an optical system for Dr. Mark Neifeld.

Research Assistant, Electrical and Computer Engineering Department, The University of Arizona, Tucson, AZ. 07/1997 to 05/1999.
Research done on image superresolution algorithms based on iterative methods and Poisson statistics for Dr. Malur Sundareshan.

Journal Publications

12. "**Exploiting Spatio-Temporal Structure with Recurrent Winner-Take-All Networks**," Eder Santana, Matthew Emigh, Pablo Zegers, and Jose Principe, IEEE Transactions on Neural Networks and Learning Systems, Accepted, 2017.

11. "**Information Theoretical Measures for Achieving Robust Learning Machines**," Pablo Zegers, Roy Frieden, Carlos Alarcón, and Alexis Fuentes, Entropy, Information Theoretical Learning Special, August, 2016.

10. "**Fisher Information Properties**," Pablo Zegers, Entropy, vol. 17, no. 7, July, 2015.

9. "**A Novel, Fully Automated Pipeline for Period Estimation in the EROS 2 Data Set**," Pavlos Protopapas, Pablo Huijse, Pablo A. Estevez, Pablo Zegers, Jose C. Principe, and Jean-Baptiste Marquette, The Astrophysical Journal Supplement Series, vol. 216, no. 2, February, 2015.

8. "**Computational Intelligence Challenges and Applications on Large-Scale Astronomical Time Series Databases**," Pablo Huijse, Pablo A. Estévez, Pavlos Protopapas, José C. Príncipe, and Pablo Zegers, IEEE Computational Intelligence Magazine, vol. 9, no. 3, August, 2014.

7. "**Uncalibrated Neuro-Visual Servoing Control for Multiple Robot Arms**," R. García-Rodríguez and P. Zegers, International Journal of Advanced Robotic System, vol. 10, August 14, 2013.

6. "**Relative Entropy Derivative Bounds**," P. Zegers, A. Fuentes, and C. Alarcón, Entropy, vol. 15, no. 7, pp. 2861-2873, July 23rd, 2013.

5. "**An Information Theoretic Algorithm for Finding Periodicities in Stellar Light Curves**," P. Huijse, P. Estévez, P. Zegers, J. C. Principe, and P. Protopapas, IEEE Transaction on Signal Processing, vol. 60, no. 10, pp. 5135-5145, October 2012.

4. "**Period Estimation in Astronomical Time Series Using Slotted Correntropy**," P. Huijse, P. Estévez, P. Zegers, J. C. Principe, and P. Protopapas, IEEE Signal Processing Letters, vol. 18, no. 6, pp. 371-374, June 2011.

3. "**Influence of Platform Height, Door Width, and Fare Collection on Bus Dwell Time. Laboratory Evidence for Santiago de Chile**," R. Fernandez, P. Zegers, G. Weber, and N. Tyler, Transportation Research Record, vol. 2143, pp. 59-66, 2010.

2. "**Learning to Fall: Designing Low Damage Fall Sequences for Humanoid Soccer Robots**," J. Ruiz-del-Solar, R. Palma-Amestoy, R. Marchant, I. Parra-Tsunekawa, and P. Zegers, Robotics and Autonomous Systems, no. 57, pp. 796-807, July, 2009.

1. "**Trajectory Generation and Modulation Using Dynamic Neural Networks**," P. Zegers and M. K. Sundareshan, IEEE Transactions on Neural Networks, vol. 14, no. 3, May, 2003.

Conference Publications

19. "**Learning and Recognizing Human Action from Skeleton Movement with Deep Residual Neural Networks**", H.-H. Pham, L. Khoudour, A. Crouzil, P. Zegers, and S. Velastin, International Conference on Pattern Recognition Systems, Madrid, Spain, 2017.

18. "**People Counting in Videos by Fusing Temporal Cues from Spatial Context-Aware Convolutional Neural Networks**", P. Sourtzinos, S. Velastin, M. Jara, P. Zegers, and D. Makris, European Conference on Computer Vision, Amsterdam, Netherlands, 2016.

17. "**Passenger Saturation Flows through Public Transport Doors**", R. Fernández, A. Valencia, S. Seriani, J. Fernández, and P. Zegers, European Transport Conference, Frankfurt, Germany, 2013.

16. "**Computational Challenges in Processing Very Large Astronomical Survey Databases**", P. Huijse, P. A. Estévez, P. Protopapas, P. Zegers, and J. C. Príncipe, 9th Asia-Pacific Symposium on Information and Telecommunication Technologies, Santiago and Valparaiso, Chile, Noviembre, 2012.

15. "**Period Detection in Light Curves from Astronomical Objects Using Correntropy**," P. A. Estévez, P. Huijse, P. Zegers, J. C. Principe, and P. Protopapas, Proceedings of the IEEE International Joint Conference on Neural Networks, Barcelona, Spain, 2010.

14. "**Alto del Andén, Ancho de Puertas y Cobro de Tarifa en la Demora al Transporte Público. Resultados de Experiencias en Laboratorio**," R. Fernandez, P. Zegers, G. Weber, G. Figueroa, and N. Tyler, Proceedings of the XVI Congreso Panamericano de Ingeniería de Tránsito y Transporte, Lisbon, Portugal, 2010.

13. "**Platform Height, Door Width, and Fare Collection on Public Transport Dwell Time: a Laboratory Study**," R. Fernandez, P. Zegers, G. Weber, G. Figueroa, and N. Tyler, Proceedings of the 12th WCTR, Lisbon, Portugal, 2010.

12. "**Bounded-Time System Identification under Neuro-Sliding Training**," R. Garcia-Rodriguez, P. Zegers, and V. Parra-Vega, Proceedings of the IEEE International Joint Conference on Neural Networks, Atlanta, USA, 2009.

11. "**Designing Fall Sequences that Minimize Robot Damage in Robot Soccer**," J. Ruiz-Del-Solar, R. Palma-Amestoy, P. Vallejos, R. Marchant, and P. Zegers, Lecture Notes in Computer Science 5399 (RoboCup Symposium 2008), pp. 271-283, 2008.

10. "**Boosting Learning Machines with Function Compositions to Avoid Local Minima in Regression Problems**," P. Zegers and G. Correa, Proceedings of the IEEE International Joint Conference on Neural Networks, Orlando, USA, August 2007.

9. "**Consistent Density Function Estimation with Multilayer Perceptrons**," P. Zegers and J. G. Johnson, Proceedings of the IEEE World Congress on Computational Intelligence, Vancouver, Canada, July 2006.

8. "**Exponential Transitions: Telltale Sign of Consistency in Learning Systems**," P. Zegers and J. G. Johnson, Proceedings of the IEEE World Congress on Computational Intelligence, Vancouver, Canada, July 2006.

7. "**Semi-Autonomous Neural Networks Differential Equations Solver**," J. Delpiano and P. Zegers, Proceedings of the IEEE World Congress on Computational Intelligence, Vancouver, Canada, July 2006.

6. "**Density Function Estimation with Multilayer Perceptrons**," P. Zegers and J. G. Johnson, Proceedings of the II IEEE Latin-American Robotics Symposium, Sao Luis, Brazil, September 2005.

5. "**Systematic Testing of Generalization during Training in Regression-Type Learning Scenarios**," P. Zegers and M. K. Sundareshan, Proceedings of the IEEE International Joint Conference on Neural Networks, Budapest, Hungary, July 2004.

4. "**Determining the Degree of Generalization Using an Incremental Learning Algorithm**," P. Zegers and M. K. Sundareshan, Proceedings of the Second International Conference on Hybrid Intelligent Systems, Santiago, Chile, December 2002.

3. "**Periodic Motions, Mapping Ordered Sequences, and Training of Dynamic Neural Networks to Generate Continuous and Discontinuous Trajectories**", P. Zegers and M. K. Sundareshan, Proceedings of the IEEE International Joint Conference on Neural Networks, Como, Italy, July 2000.

2. "**Role of Over-Sampled Data in Super Resolution Processing and a Progressive Upsampling Scheme for Optimized Implementations of Iterative Restoration Algorithms**," M. K. Sundareshan and P. Zegers, Proceedings of the SPIE Conference on Passive Millimeter-Wave Imaging Technology, AeroSense, Orlando, Florida, April 1999.

1. "**Optimal Tailoring of Trajectories, Growing Training Sets, and Recurrent Networks for Spoken Word Recognition**," P. Zegers and M. K. Sundareshan, Proceedings of the IEEE International Conference on Neural Networks, Anchorage, Alaska, May 1998.

Chapters in Books

1. "**Cartesian Controllers for Tracking of Robotic Manipulators under Parametric Uncertainties**", R. García and P. Zegers, Intech, 2011.

Edited Books

1. "**Advances in Self-Organizing Maps**", edited by P. Estévez, J. Príncipe and P. Zegers, Springer, 2012.

Patents

2. "**Method and a System for Solving Difficult Learning Problems Using Cascades of Weak Learners**," P. Zegers and G. Correa, USPTO Patent Application 20090043717, application done on February, 2009.

1. "**Method and a System for Solving Dynamic Problems Using the Dynamical System Architecture**," P. Zegers, USPTO Patent 6,751,601, granted on June, 2004.

Teaching Experience

Professor. Electromagnetism, Analog Systems, Analog Design, Digital Systems, Computer Architecture and Communication Systems, Signals and Systems, Artificial Intelligence, Machine Learning. College of Engineering and Applied Sciences, Universidad de los Andes, Santiago, Chile. 03/2002 to 06/2017.
Professor of these courses.

Teaching Assistant. Electric Design Laboratory. Electrical and Computer Engineering Department, The University of Arizona, Tucson, AZ. 08/1999 to 12/2000.
Responsible for helping students to complete hardware projects aimed towards building an operational amplifier.

Digital Systems Laboratory Instructor, Electrical Engineering Department, Pontificia Universidad Católica de Chile, Chile. 03/1995 to 07/1995.
Responsible for helping students to complete a variety of digital hardware projects.

Research Grants

"Desarrollo de una Máquina Clasificadora de Objetos de Bajo Costo Diseñada en Base a Tecnología de Visión Artificial," CORFO I+D Aplicada 13IDL2-18719, *Project Director*, 07/2013-12/2014.

"Autonomous Pedestrian Detection," FONDECYT 1120680, CONICYT, Chile, Principal Investigator, *Project Director*, 03/2012-03/2015.

"Mutual Information Estimation using Universal Function Approximators," FONDECYT 1040340, CONICYT, Chile, *Project Director*, 03/2004-02/2006.

"Density Function Estimation using Multilayer Perceptrons," Fondo de Ayuda a la Investigación, Universidad de los Andes, *Project Director*, 00/2003-12/2004.

Collaboration in Other Projects

"Real Time Laboratory Study of Passenger Service Time in Public Transport," Fondo de Ayuda a la Investigación, Universidad de los Andes, 00/2003-12/2004.

"Experimental Study of Vehicle-Passenger Interactions at Public Transport Stations," FONDECYT 1080381, CONICYT, Chile, 03/2008-03/2011.

"Microscopic Modeling of Passenger-Vehicle Interactions for Designing Mass Transport Systems Based on Buses," Fondo de Ayuda a la Investigación, Universidad de los Andes, 03/2007-02/2009.

Current University Administrative Positions

Counselor in the Center for General Education of the Universidad de los Andes. 03/2014 to 06/2017.

Director of the Research Center of the College of Engineering and Applied Sciences of the Universidad de los Andes. 03/2012 to 06/2017.

Research Ethics Committee Secretary, Universidad de los Andes, Santiago, Chile. 03/2010 to 06/2017.

Associate Professor. College of Engineering and Applied Sciences, Universidad de los Andes, Santiago, Chile. Since 01/2010.

University Administrative Experience

Interim Dean. College of Engineering and Applied Sciences, Universidad de los Andes, Santiago, Chile. 10/2010 to 11/2010.
Management of the College of Engineering and Applied Sciences (design of strategig plans, manage marketing campaigns, people hiring, study of academic programs, coordinate student activities, build infrastructure, buy equipment, etc.).

Academic Director. College of Engineering and Applied Sciences, Universidad de los Andes, Santiago, Chile. 07/2006 to 11/2010.
Management of the College of Engineering and Applied Sciences (design of strategig plans, manage marketing campaigns, people hiring, study of academic programs, coordinate student activities, build infrastructure, buy equipment, etc.).

Private Sector Experience

Founder and Research Advisor, Sortbox, Santiago, Chile. Since 07/2017.
Leading a team in charge of building artificial intelligences for the agrotech sector.

Founder and Research Advisor, Anastasia, Santiago, Chile. Since 12/2016.
Leading a team in charge of building artificial intelligences for natural language conversation.

Research Advisor, Webdox, Santiago, Chile. Since 10/2016.
Leading a team in charge of building artificial intelligences for legal text processing.

Consulting, Agrosuper, Santiago, Chile. 09/2015.
Technical evaluation of different robotic solutions.

Consulting, Fundación Paz Ciudadana, Santiago, Chile. 05/1999.
A study of the relationship between crime rates, the structure of the judicial system, and police resources using a stochastic model.

Technological Projects Leader, Redbanc S.A., Santiago, Chile. 01/1997 to 06/1997.
Leader or member of teams responsible for financial assessment, technical design, and implementation of projects related to the needs of Chilean banking community. The most important project was a study done on the financial feasibility of centralizing all SWIFT operations of the Chilean banking community into a single transactional switch.

Projects Engineer, Redbanc S.A., Santiago, Chile. 01/1994 to 08/1995.
Member of teams responsible for financial assessment, technical design, and implementation of projects related to the needs of the banking community. The most relevant project was the design and implementation of a file transfer system that was used by the majority of the banks of Chile for several years.

Partner in Open Mind Limited, Santiago, Chile. 06/1992 to 12/1993.
Shared management responsibilities with the other partners. Financial assessment, technical design, and implementation of software projects. The most important of these projects was the design and implementation of a set of Touch Screen Kiosks for a Chilean chain of supermarkets.

Programmer, Zegers y Asociados Limited, Santiago, Chile. 03/1989 to 06/1992.
Developed software for structural analysis of buildings. Part time programmer.

Honors and Awards

Best Academic Advisor of the College of Engineering and Applied Sciences of the Universidad de los Andes, Given to professors that show the highest level of engagement with the students. 03/2013.

Second Place, Patenting Contest organized by NEOS, funding from the Programa Bicentenario en Ciencias y Tecnología of CONICYT. 10/2005.

IEEE Student Travel Grant. 07/2000. Grant used to assist to the International Joint Conference on Neural Networks, Como, Italy, 2000.

Nominated for the "Best Teaching Assistant" Award Competition, The University of Arizona, Tucson, AZ. 04/2000. This is a university wide competition where the nominees come from all the colleges of the university.

First Place, Electrical, Chemical and Mechanical Engineering category, Graduate Level, 1998 Student Showcase, The University of Arizona, Tucson, AZ. 11/1998. Project title: "*Accent Helper*," a software system conceived for helping people to improve their accent in non-native languages.

Societies

IEEE Senior Member since 2004. IEEE Member since 2000.

Member, founding member of the Chilean Chapter of the IEEE Computational Intelligence Society, the first ever founded in the world, since 2003.

Other

Advisor of more than 80 engineer thesis since 2002.

Member of the Organizing Committee of the IEEE Latin American Summer School in years 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, and 2013.

Program Chair of IEEE LARS (2006, 2009), JCC (2010), CIARP (2011), CWPR (2011), WSOM (2012).

Member of the Organizing Committee of the WHIX conference on Environment, Renewable Energy and Innovative Technologies for Disaster Response in 2008.

Senior Member Nomination Committee Chairman of the IEEE Computational Intelligence Society. 01/097, January, 2007, to June, 2008.

Member of the Educational Activities Steering Committee of the Chilean branch of the IEEE in years 2009 and 2010.

Member of the Jury of the IEEE Latin American Student Robotics Contest in years 2003, 2004, and 2005.

Founder member of Ritmos Latinos, a salsa dancing association at the University of Arizona that exists since 2000.

Technical Skills

Linux, Windows, C++, OpenCV, Python, TensorFlow, Matlab, Octave, Pspice.

Languages

Spanish (native), English