



# MIGUEL A. SOLIS

Head at Automation and Robotics Engineering,  
Universidad Andrés Bello.

## PROGRAMMING SKILLS

Python



C



NumPy, Pandas



Matlab



LabView



L<sup>A</sup>T<sub>E</sub>X



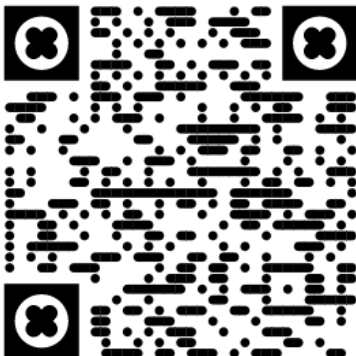
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## CONTACT

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## WORK EXPERIENCE

**Head at Automation and Robotics Engineering**  
Associate Professor 2023-today  
Assistant Professor 2020-2022  
**Universidad Andrés Bello. Santiago, Chile**

Feb. 20 - Today

### Undergraduate courses:

- Thesis supervision 30 students
- Industrial Process Control 2020
- Introduction to Automatic Control 2020
- Electric Circuits and Machines 2020
- Automata Theory and Formal Languages 2023
- Computers Programming (Python 3.x) 2024

### Graduate courses:

- Thesis supervision 6 students
- Internet of Things 2021
- Advanced Digital Networks 2021-2022
- Data Science Projects 2022
- Reinforcement Learning for Autonomous Agents 2022-2023
- IoT and Blockchain 2023

**Invited Lecturer**  
**Universidad Adolfo Ibáñez. Santiago, Chile**

2023-2024

### Undergraduate courses:

- Internet of Things 2024
- Programming Languages 2024
- Data Structures & Algorithms 2024
- Operating Systems 2023

### Graduate courses:

- Reinforcement Learning for Autonomous Agents 2023

**Invited Lecturer**  
**Universidad Central. Santiago, Chile**

2023-2024

### Graduate courses:

- Thesis supervision 1 student
- Internet of Things 2022-2024

# EDUCATION

## 2012 - 2017

### Dr.-Eng., Informatics

Universidad Técnica Federico Santa María

Reinforcement Learning on Control Systems with Unobserved States.

#### Supervisors:

- Prof. Héctor Allende, Informatics Dept.
- Prof. Manuel Olivares, Electronics Dept.

## 2010 - 2012

### M.Sc., Electronics

Universidad Técnica Federico Santa María

State estimation of systems observed over erasure channels.

#### Supervisor:

- Prof. Eduardo I. Silva.

## 2006 - 2012

### Electronics Engineering

Universidad Técnica Federico Santa María

Professional title with B.Sc. degree.

# LANGUAGES

## English

### TOEFL

Sept. 2016

#### Reading

#### Listening

#### Writing

#### Speaking

- Robotics Fundamentals

2022-2023

#### Invited Lecturer

Universidad Católica del Norte. Coquimbo, Chile

2023

Taught courses:

- Artificial Intelligence

2023

#### Interim Academic

Universidad Católica del Norte. Antofagasta, Chile

Jul. 18 - Jan. 20

Taught courses:

- Operating Systems
- Robotics Fundamentals
- Internet of Things

2018-2019

2018-2019

2019

#### Instructor

Universidad Andrés Bello. Viña del Mar, Chile

Apr. 17 - Jun. 18

Undergraduate thesis supervision (4 students).

Taught courses:

- Computers Programming (Python)
- Computers Programming (C)
- Computer Architecture
- Operating Systems
- Computer Networks

2014-2018

2016-2017

2014-2017

2014-2017

2014-2017

#### Part-time lecturer

Universidad Técnica Federico Santa María. Valparaíso, Chile

Aug. 12 - Jun. 18

Taught courses:

- Computers Programming (Python 2.x)

2012-2018

# PUBLICATIONS

## Journals

Web of Science

[1] F. Cruz, **M.A. Solis** and N. Navarro-Guerrero. Cognitive inspired aspects of robot learning (**editorial**). *Frontiers in Neurorobotics*, **2023**. (e)ISSN 1662-5218.

[2] F. Cruz, T.G. Karimpanal, **M.A. Solis**, P. Barros and R. Dazeley. Human-aligned reinforcement learning for autonomous agents and robots (**editorial**). *Neural Computing and Applications*, **2023**. ISSN 0941-0643.

[3] R. Torres, **M.A. Solis**, R. Salas and A.F. Bariviera. A Dynamic Linguistic Decision Making Approach for a Cryptocurrency Investment Scenario. *IEEE Access*, vol.8: 228514-228524, **2020**. (e)ISSN 2169-3536.

[4] **M.A. Solis**, M. Olivares and H. Allende. A Switched Control Strategy for Swing-Up and State Regulation for the Rotary Inverted Pendulum. *Studies in Informatics and Control*, 28(1): 45-54, **2019**. ISSN 1220-1766.

# CONFERENCES (5 LAST YEARS)

## IEEE ChileCon 2023

### Program Committee

Chilean Conference on Electrical Electronic Engineering, Informatics and Communications Technology

## SENTIROBOTS Workshop 2023

### Technical Committee

2nd International Workshop on Sentiment Analysis and Emotion Recognition for Social Robots

## TICXED 2023

### Program Committee

Chilean Congress on IT and Education

## ISR 2023

### Technical Committee

International Symposium on Robotics

## ALA 2023

### Program Committee

Adaptive and Learning Agents Workshop at AAMAS 2023

## LACORO 2023

### Organizer

Latin American Summer School on Cognitive Robotics

## ICoSR 2023

### Technical Committee

2nd International Conference on Service Robotics

## ALA 2022

### Program Committee

Adaptive and Learning Agents Workshop at AAMAS 2022

## ISR 2022

[5] **M.A. Solis**, M. Olivares and H. Allende. Stabilizing Dynamic State Feedback Controller Synthesis: A Reinforcement Learning Approach. *Studies in Informatics and Control*, 25(2): 245-254, **2016**. ISSN 1220-1766.

[6] E.I. Silva and **M.A. Solis**, An alternative look at the constant-gain Kalman filter for state estimation over erasure channels, *IEEE Transactions on Automatic Control*, 58(12): 3259-3265, **2013**. ISSN 0018-9286.

## Journals

Scopus

[1] J. Cornejo, S. Barrera, C.H. Ruiz, F. Gutierrez, M.O. Casasnovas, ... and E.A. L'huillier. Industrial, Collaborative and Mobile Robotics in Latin America: Review of Mechatronic Technologies for Advanced Automation, *Emerging Science Journal*, 7(4): 1430-1458, **2023**. (e)ISSN 2610-9182.

## Conference Proceedings

Scopus

[1] R. Torres, **M.A. Solis**, V. Martinez and R. Salas, A Nested-Cascade Machine Learning Based Model for Intrusion Detection Systems. *IEEE Chilean Conference on Electrical, Electronics Engineering, Information and Communication Technologies (CHILECON)*, **2023**.

[2] F. Coiro, **M.A. Solis**, C.J. Nettle and A. Chila, Pre-robot: an open-source educational robotics platform for preschoolers. *Proceedings of the 5th Congress on Robotics and Neuroscience*, **2020**.

[3] F. Ollino, **M.A. Solis** and H. Allende, Batch Reinforcement Learning on a RoboCup SSL keep-away strategy learning problem. *Proceedings of the 4th Congress on Robotics and Neuroscience*, **2018**.

[4] P. Navarrete, C.J. Nettle, C. Oliva and **M.A. Solis**, Fostering Science and Technology Interest in Chilean Children with Educational Robot Kits. *Proceedings of the 13rd IEEE Latin American Robotics Symposium*, **2016**.

[5] G.A. Ahumada, C.J. Nettle and **M.A. Solis**, Accelerating Q-learning through Kalman Filter Estimations applied in a RoboCup SSL Simulation, *Proceedings of the 10th IEEE Latin American Robotics Symposium*, **2013**.

[6] E.I. Silva and **M.A. Solis**, An approach to stationary state estimation with missing data, *Proceedings of the 9th IEEE International Conference on Control & Automation*, **2011**.

## Book Chapters

[1] O. Silva and **M.A. Solis**, Evolutionary Function Approximation for Gait Generation on Legged Robots. In *Nature-Inspired Computing for Control Systems*, Springer, **2016**. Editor: Hiram Ponce.

# PROJECTS

## Advisor

2023

Sistema convertidor de plástico a combustible móvil.

**Funded by:** ANID Fondef VIU.

**Technical Committee**  
International Symposium on Robotics

### SENTI Workshop 2022

**Technical Committee**  
International Workshop on Sentiment Analysis and Emotion Recognition for Social Robots

### IWoSR 2021

**Technical Committee**  
International Workshop on Service Robotics

### TICXED 2021

**Program Committee**  
Chilean Congress on IT and Education

### HARL 2021

**Co-organizer**  
Workshop on Human-aligned Reinforcement Learning for Autonomous Agents and Robots at IEEE ICDL 2021

### IEEE ICDL 2020

**Workshops Chair**  
International Conference on Development and Learning

### LACORO 2020

**Organizer**  
Latin American Summer School on Cognitive Robotics

### TICXED 2020

**Program Committee**  
Chilean Congress on IT and Education

### CRoNe 2019

**Program Committee**  
5th Congress on Robotics and Neuroscience

### INFONOR 2019

**Track co-chair**

### Principal Investigator

2023

exploreCSR program (explore Computer Science Research) + Supplemental REU Funding (research experience for undergraduates).

**Funded by:** Google Research.

### Principal Researcher from Chilean group

2021-2023

Red de prevención, mitigación y rehabilitación de áreas afectadas por incendios forestales (REDPREMIA).

**Funded by:** Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo CYTED.

### Advisor

2020-2022

Robótica educativa a distancia para actividades docentes a través de laboratorios remotos de alta disponibilidad y escalabilidad.

**Funded by:** Fundación Gabriel & Mary Mustakis.

### Co-researcher

2016-2017

Self-aware and self-organizing things for reconfiguring Web mashups of things during runtime.

**Funded by:** Universidad Andrés Bello.

### Project leader

2012-2013

Equipo RoboCup F-180 (students line)

**Funded by:** Mineduc (FDI 2011 and FDI 2012).

## EDITORIAL ACTIVITIES

### Guest editor

2023

#### Neural Computing and Applications

Part of the guests editors for Topical Collection (Special Issue) on Human-aligned Reinforcement Learning for Autonomous Agents and Robots.

### Guest editor

2023

#### Frontiers in Neurorobotics

Part of the guests editors for Research Topic on Cognitive Inspired Aspects of Robot Learning.

### Journal Reviews

- IEEE Latin America Transactions.
- IEEE Transactions on Smart Grid.
- IEEE Transactions on Systems, Man and Cybernetics: Systems.
- BioMedical Engineering Online.
- Neural Computing and Applications.

10th International Conference on Computing and Informatics in Northern Chile

## **AWARDS**

**2022**

**Senior Membership Elevation**  
IEEE

**2020**

**Excellent Oral Presentation**  
5th Congress on Robotics and Neuroscience

**2017**

**Academic Excellence Award**  
Graduate School, Universidad Técnica Federico Santa María

**2011 and 2015**

**Scientific Research Initiation Program**  
Universidad Técnica Federico Santa María

**2009 to 2012**

**List of Honor of Students**  
Universidad Técnica Federico Santa María

## **EXTERNAL EXAMINER**

**Dr.Sc. on Automation Engineering (2021)**

**Oscar Loyola.**

Universidad de Santiago de Chile.

*Nueva metodología para la interacción entre múltiples robots cognitivos basados en elementos jerárquicos.*

**Advisor:** Prof. John Kern

**M.Sc. on Biomedical Engineering (2020)**

**Maily Caldeón.**

Universidad de Valparaíso.

## **INVITED TALKS**

**Tutorial**

**Escuela Internacional de Primavera sobre Entornos Ubicuos y Aplicaciones de Robots Sociales**  
Introducción práctica al aprendizaje por refuerzos con Gym en Python.

**Tutorial**

**Arduino Day 2023 Chile**  
Carga inalámbrica de código en Arduino.

**Tutorial**

**Arduino Day 2022 Chile**  
Programación de Arduino mediante CLI.

**Plenary Talk**

**CIIS 2021: XXII Congreso Internacional de Informática y Sistemas.**  
Toma de decisiones con un enfoque difuso para transacciones con criptomonedas.

**Tutorial**

**Arduino Day 2021 Chile**  
Programación de Arduino mediante CLI.

**Plenary Talk**

**CIIS 2019: XX Congreso Internacional de Informática y Sistemas.**  
Agregación de información con lógica difusa para la toma de decisiones en entornos dinámicos.

**Plenary Talk**

**CIIS 2018: XIX Congreso Internacional de Informática y Sistemas.**  
Introducción al aprendizaje reforzado con Jupyterhub.

**Plenary Talk**

**CRoNe 2018: IV Congress on Robotics and Neuroscience.**  
Introducción práctica al aprendizaje reforzado con aplicaciones en robótica.

**Tutorial**

**CRoNe 2018: IV Congress on Robotics and Neuroscience.**  
Herramientas para cómputo y visualización de datos en Python 3.x.

**Tutorial**

*Biomechanical signal processing and machine learning frameworks for the human movement analysis.*

**Advisor:** Prof. Carolina Saavedra.

### **M.Sc. on Informatics Engineering (2019)**

**Rubén Castro.**

Universidad Católica del Norte.

*Diseño e implementación de un sistema de control de nivel no lineal para ensayos de controladores basados en sistemas inteligentes.*

**Advisor:** Prof. José Gallardo.

### **M.Sc. on Informatics Engineering (2019)**

**Carolina Silva.**

Universidad Católica del Norte.

*Diseño, caracterización y fabricación de una pinza robótica interconectable modular con robótica blanda.*

**Advisor:** Prof. José Gallardo.

### **M.Sc. on Electronics Engineering (2019)**

**Hans Lehnert.**

Universidad Técnica Federico Santa María.

*Mecanismos Bio-Inspirados Aplicados a Tareas de Navegación en Agentes Artificiales.*

**Advisor:** Prof. María José Escobar.

## **MEMBERSHIPS**

**IEEE, Member** +15 years

**IEEE RAS, Member** +10 years

**Centro de Innovación y Robótica** +7 years

**IEEE T.C. on Neuro-Robotics Systems** +6 years

**EVIC 2017: XIII Escuela de Verano de Inteligencia Computacional.**  
Aprendizaje reforzado: conceptos básicos y aplicaciones en robótica.

### **Tutorial**

**CRoNe 2017: III Congress on Robotics and Neuroscience.**  
NumPy y herramientas de visualización en Python.

## **MISCELLANEOUS**

### **Research Committee Delegate**

2023 - Today

Research Committee Delegate to the IFR (International Federation of Robotics) General Assembly.

### **President**

2023 - Today

President at NGO Centro de Innovación y Robótica.

### **Vice-President**

2023 - Today

Vice-President of the Executive Committee at IEEE Chile Centro Section.

### **President**

2022 - 2023

President of the Executive Committee at Technical Chapter IEEE Robotics and Automation Society Chile Centro Section.

### **Academic Committee at Professional Master**

2021 - Today

Part of the Academic Committee at Professional Master degree Magister en Tecnologías de la Información y Telecomunicaciones. UNAB.

### **Cybersecurity Board at Senate of Chile**

2022

Part of the Cybersecurity Board within the Future Challenges, Science, Technology and Innovation Committee at Senate of Chile.

### **Volunteer adviser at PAR Explora Antofagasta**

2019

Volunteer adviser in Investigación Científica Escolar (Science Research for School Students) activity within PAR Explora Antofagasta.

### **General Secretary**

2017-2023

General Secretary at NGO Centro de Innovación y Robótica.

### **Competitive Programming Coach**

2017

Volunteer coaching for competitive programming groups from different schools, aiming to participate at the Olimpiadas Chilenas de Informática (Chilean Olympics on Informatics).