Cristóbal Jesús Nettle Vacher

Personal Details

- Degree: Ms. in Electronic Engineer and Professional Electronic Engineer, from Universidad Técnica Federico Santa María (UTFSM). September, 2016.
- Ocuppation: Ph.D. candidate in the program of Electronic Engineering at UTFSM
- NIN: 16.978.425-6
- Nationality: Chilean
- Date of birth: 25th April 1989
- Address: 446, Carmen, Apartment 607, Valparaíso, Chile
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- E-mail: cristobal.nettle@gmail.com

Profesional experience

2017 - now **Centro de Innovación y Robótica**

Position: Treasurer.

Function: Active participation as part of the Board of Directors of this non-profitable institution devoted to lead and support research and development inmerse in the areas of applied robotics, artificial intelligence, data science and educational robotics.

2016 - now **Research assistant, Advanced Center for Electrical and Electronic Engineering AC3E, Biomedical Systems.**

Position: Research assistant.

Function: Research on bio-inspired controllers applied in robotic systems, converging computational neuroscience and artificial intelligence.

2021 S2 **Lecturer of the course Design of Electric Circuits, Ingeniería en Automatización y Robótica, UNAB.**

Position: Lecturer.

Function: Define and impart course on design of printed circuit boards using Eagle software, including reviews and considerations for propper fabrication.

2020-2021 S2 **Lecturer of the course Electric Networks, Ingeniería en Automatización y Robótica, UNAB.**

Position: Lecturer.

Function: Impart and prepare a co-executed course introducing the analysis and design of electric circuits, three-phase systems and Fourier Transform.

2019 S2 **Lecturer of the course Intelligent Systems, Departamento de Informática, Universidad Central.**

Position: Lecturer.

Function: Actualize and impart of a course introducing Intelligent Systems, focused on Reinforcement Learning and Neural Networks.

2019 S2 **Lecturer of the course Complexity of Algorithms, Departamento de Informática, Universidad Central.**

Position: Lecturer.
Function: Define and impart a course on complexity of algorithms, with mathematical descriptions and structural analysis of searching algorithms and common programming approaches.

2018 - 2019 S1 **Lecturer of the course Object Oriented Programming, Departamento de Electrónica, UTFSM.**
Position: Lecturer.
Function: Impart a co-executed course of Object Oriented Programming, introducing Java, C++, Software Development Methodologies and the development of Android Applications on Android Studio.

2018 - 2019 S1 **Lecturer of the course Computer Networks, Ingeniería en Computación e Informática, UNAB**
Position: Lecturer.
Function: Actualize and impart a course introducing Computer Networks, including the use of Cisco Packet Tracer and Unix tools for network analysis.

2018 S2 **Lecturer of the course Operative Systems, Ingeniería en Computación e Informática, UNAB**
Position: Lecturer.
Function: Actualize and impart a course introducing Operative Systems, with practical activities on a Linux system.

2016 - 2018 **Kraken Labs**
Position: Development engineer.
Function: Kraken Labs is a prototypes laboratory, which receives different kind of projects that are: prototypes/products of innovative products, or prototypes for engineering enterprises. The main project involved here is the development of a product prototype of a wrist-band for biological measures made for kids, which includes Bluetooth Low Energy technology and advanced bio-sensors installation, acquisition and an adequate signal processing.

2016 Sept-Nov **Alcyone Innova.**
Position: Development engineer.
Function: Support engineer in a smart-city implementation for security and emergency signaling porpuses which considered the use of a Raspberry-Pi based wireless node, extended with Xbee modules for wireless sensors and actuators.

2016 S1 **Lecturer of the course Introduction to Robotics, Departamento de Informática, UTFSM.**
Position: Lecturer.
Function: Define and impart an introductory course of robotics. The course covered the following topics: sensors and estimation processes, actuators, kinematics, movement control.

2015 S1 **Lecturer of the course Introductions to Robotics and Artificial Intelligence, Facultad de Ingeniería, Universidad Adolfo Ibáñez**
Position: Lecturer.
Function: Impart an introductory course of robotics and artificial intelligence. The course covered the topics: sensors and estimation processes, sensor fusion, kinematics, path planning, mapping, artificial neural networks, introduction to reinforcement learning.

2014 Sept-Dic **SOTALTIM Spa.**
Position: Development engineer.

Function: Support engineer in a sensor network implementation for agricultural and farming and fire emergency applications. The node considered the use of a Arduino Yun based wireless node wich integrates an OpenWrt Linux system, network completed with Xbee compatible modules.

2012 - 2014 **Assistant in the project KEOpS, Algorithms for modelling the visual system: From natural vision to numerical applications. INRIA (France) – UV, UTFSM, U. de Chile (Chile)**

Position: Research assitant.

Function: Implementation of a mathematical model of movement detection in retina, over VirtualRetina simulator, and development of an user graphics interface in MATLAB for visual experiments.

2011 S1 - 2012 S1 **Digital Systems Laboratory, Departamento de Electrónica, UTFSM**

Position: Laboratory assistant.

Function: Assistant in a classroom laboratory which contemplates the uses of logical circuits, combinational networks, sequential machines and servomotors, applied over a FPGA using Verilog, a hardware descriptor language.

2010 S1 - S2 **Physics Laboratory, Departamento de Física, UTFSM**

Position: Laboratory assistant.

Function: Assistant in a classroom laboratory for the course of Electrostatics.

Education

2017 - Present **Enrolled in the PhD program in Electronic Engineering, Universidad Técnica Federico Santa María.**

Subjects: Computational Neuroscience, Bio-inspired Artificial Intelligence.

Thesis: *Closing the loop for reward learning: an extended integration of striatal dopaminergic effects in decision-making.*

Tutor: María José Escobar Silva, Ph.D.

2014 - 2016 **Master of Science in Electronic Engineering, Universidad Técnica Federico Santa María.**

Courses taken: Electronic Bioengineering.
Seminary of Digital Signal Proccessing.
Seminary of Softcomputing.
Computer Vision.
Seminary of computer networks.
Advance desing of digital systems.

Thesis: *Bio-inspired Emotional Mechanism for Decision Making applied as an autonomous agent controller.*

Tutor: María José Escobar Silva, Ph.D.

2008 - 2016 **Professional Electronic Engineering, Universidad Técnica Federico Santa María.**
An education with strong theory knowledge, which includes several practical applies in laboratories performed throughout the study period.

Conference articles for oral presentation

2020 Carlos Pizarro, **Cristóbal J. Nettle**, Oscar Araneda, Marcelo Tuesta. *Towards an autonomous system with exhaled breath separation for cleaner condensed air samples*. 5th Congress on Robotics and Neuroscience, Valparaíso, Chile.

2020 Francisca Coiro, Miguel A. Solís, **Cristóbal J. Nettle**, Anibal Chila. *Pre-robot: An*

open-source educational robotics platform for preschoolers. 5th Congress on Robotics and Neuroscience, Valparaíso, Chile.

2017 **Cristóbal J. Nettle**, Fabián Rubilar, María José Escobar. *Coupling Robots Behavior by Introducing Reactive Motivational Orientations*. 2018 International Joint Conference on Neural Networks (IJCNN), IEEE, Brasil.

2016 **Cristóbal J. Nettle**, María José Escobar, Arthur Leblois. *Tonic Dopamine Effects in a Bio-inspired Robot Controller Enhance Expected Lifetime*. The Sixth Joint IEEE International Conference Learning and Epigenetic Robotics, France.

2016 Patricio Navarrete, **Cristóbal J. Nettle**, Constanza Oliva, Miguel A. Solís. *Fostering Science and Technology Interest in Chilean Children with Educational Robot Kits.* XIII Latin American Robotics Symposium LARS, Brazil.

2013 Gabriel A. Ahumada, **Cristóbal J. Nettle**, Miguel A. Solis. *Accelerating Q-learning through Kalman Filter Estimations applied in a RoboCup SSL Simulation*. X Latin American Robotics Symposium LARS, Perú.

Conference articles for poster presentations

2019 **Cristóbal J. Nettle**, María José Escobar, Arthur Leblois. *Natural Modulations of Decision-Making: Dopamine Beyond Reward Effects within the Basal Ganglia*. XV Annual meeting of the Chilean Society of Neuroscience, La Serena, Chile.

2016 **Cristóbal J. Nettle**, María José Escobar, Arthur Leblois. *Improving surviving: tonc dopamine control improves bio-inspired robot controller behavior in a simple survival task.* 38Th Symposium GRSNC, The Neuroscience Of Decision Making, Canada.

2013 Pizarro M., Escobar M.J., **Nettle C.**, Hurtado J.M., Araya J. and Palacios A. (2013) *Ganglion Cells Omissions Responses in Rodent Retina: Wavelength and Natural Stimuli Dependency*. IX Annual meeting of the Chilean Society of Neuroscience & VIII Ibero American Congress of Biophysics, 1-4 Octubre, Valparaíso, Chile.

2012 Gabriel A. Ahumada, Sebastián Arriagada, Cristóbal Barrientos, **Cristóbal Nettle**, Miguel Solis. *Q-learning based on Kalman filter estimations applied in a RoboCup SSL Simulation*. X Latin American Robotics Symposium LARS. VIII IEEE Latin American Summer School in Computational Intelligence.

Extra-curricular experience and projects being at UTFSM

2008 - 2011 **Muestra ELO, Competencia y Exposición Electrónica**
Position: Organizer (2008), Installation Manager (2009), Managing Director (2010), Broadcasting Director (2011).
Function: Management of a team, fundings, materials and work schedule.

2009 - 2012 **Techo para Educación y Trabajo**
Position: Tutor.
Function: Personalized tutoring for children from families with low economic status.

2009 - 2010 **Equipo Lego, Centro de Robótica, UTFSM**
Position: Participant.
Function: Building and programming of Lego NXT robots. Team participant in the Latin American Robotics Competition LARC (2009-2010), Standard Educational Kit category, and participants in Competencia Robótica UTFSM (2010).

2011 **NEO, Centro de Robótica, UTFSM**

Position: Programming Manager.

Function: Programming of a standard robotic platform, which has a computer acting as the main controller interface, connected to a Lego NXT and an Arduino microcontroller system. Team participant in the LARC 2011, OPEN category.

2011 - 2012 **USoleM, Centro de Robótica, UTFSM**

Position: Electronics area manager and, later, Project Manager.

Function: Development of the control system and energy adjust for a vehicle powered by alternative energy power. Team participant of the Atacama Solar Challenge.

2011 - 2014 **Equipo RoboCup, Centro de Robótica, UTFSM**

Position: Programmer.

Function: Development of the artificial intelligence for a multi-agent system, applied in robotic platforms, which were built under the parameters of the RoboCup Competition, Small Size category.

Distinguished: First Chilean team participant of the RoboCup Competition in Small Size category, João Pessoa, Brasil, 2014.

2013 - 2014 **Board of directors, Innovación y Robótica Estudiantil, ex Centro de Robótica, UTFSM**

Position: Projects Manager.

Function: Control and state evaluation of the projects of the robotic center of the Universidad Técnica Federico Santa María. Control of 11 simultaneous projects, with a total of 110 participants.

Skills

English domain: Advance, fluent reading, writing, and speaking. TOEFL ITP once certified (627).

Computational skills

Operative system

Unix

Windows

Libraries and webservice tools

AWS	SciPy
GIT	SQL
Google Cloud	TensorFlow

Programming Language

Python	Knowlege level: advance.
R	Knowlege level: medium.
C/C++	Knowlege level: advance.
Bash	Knowlege level: advance.
MATLAB	Knowlege level: advance.
Java	Knowlege level: advance.
Verilog	Knowlege level: medium.

Relevant information

- Part of the organizer comitee of the International Congress on Developmental Robotics ICDL2020.
- Part of the organizer comitee of the Congress on Robotics and Neuroscience, CRoNe2017, CRoNe2018 and CRoNe2019.
- Session chair at the 2018 Joint Conference in Neural Networks, part or the IEEE World Congress in Computational Intelligence, Brazil.
- Participant in the VIII IEEE Latin American Summer School in Computational Intelligence.
- Participant in the Latin American Summer School in Computational Neuroscience LACONEU 2012 and LACONEU 2014.
- Participant in the IV and V Escuela de Invierno para la Divulgación de la Robótica, Nanotecnología y Neurociencia.
- Awarded in Honour List, UTFSM, 2009 and 2010.
- Student with academic merit recognition, Departamento de Electrónica, 2009.
- Awarded with Generación 84' fellowship of the Departamento de Electrónica, 2009.