

# Bojan Mihaljević

## CURRICULUM VITÆ

February 26, 2024

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### PERSONAL INFORMATION

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Date of birth	1985/04/19
Email	boki.mihaljevic@gmail.com
Website	<a href="https://bmihaljevic.github.io/">https://bmihaljevic.github.io/</a>
Google Scholar	<a href="https://scholar.google.es/citations?user=o1ZNZ1MAAAAJ">https://scholar.google.es/citations?user=o1ZNZ1MAAAAJ</a>
Web of Science	<a href="https://www.webofscience.com/wos/author/record/733648">https://www.webofscience.com/wos/author/record/733648</a>

### EDUCATION

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2013-2018	<b>PhD in Artificial Intelligence</b> “Contributions to Bayesian network classifiers and interneuron classification”. <i>Universidad Politécnica de Madrid</i> Defended with honours ( <i>Sobresaliente cum laude</i> ).
2011-2013	<b>MSc in Artificial Intelligence</b> <i>Universidad Politécnica de Madrid</i> Master’s thesis defended with honors ( <i>Matrícula de honor</i> )
2005-2010	<b>BSc in Computer Science and Business Management</b> <i>Universidad Diego Portales</i> (Chile). One semester (2008/09-2009/01) at <i>Universidad de Alicante</i>
2000-2004	<i>Matematička Gimnazija</i> Belgrade (Serbia) A secondary school with an advanced mathematics, physics and computer science curriculum.

## AWARDS AND GRANTS

2015	UPM grant for a three-month stay at the <i>École Polytechnique Fédérale de Lausanne</i> , Switzerland
2012	José Cuenca award for students with highest marks. <i>Master in Artificial Intelligence Research</i> , Universidad Politécnica de Madrid
2003	5th place, National Competition in Informatics for Secondary School Students (Serbia)

## POSITIONS HELD

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2024 - present	<b>Associate Professor</b> <i>Departamento de Inteligencia Artificial</i> Universidad Politécnica de Madrid.
2022 - 2024	<b>Assistant Professor</b> <i>Departamento de Inteligencia Artificial</i> Universidad Politécnica de Madrid.
2021 - 2022	<b>Assistant Professor</b> <i>Departamento de Matemáticas</i> Universidad Autónoma de Madrid.
2020 - 2021	<b>Post-doc</b> 'BAYES-CLIMA-NEURO: <i>Inteligencia artificial para desarrollar sistemas de predicción climática</i> ' project Universidad Politécnica de Madrid.
2018 - 2020	<b>Post-doc</b> <i>Human Brain Project</i> Universidad Politécnica de Madrid.
2013 - 2018	<b>PhD student</b> <i>Cajal Blue Brain Project</i> Universidad Politécnica de Madrid
2012 - 2013	<b>Research scholarship</b> <i>Cajal Blue Brain Project</i> Universidad Politécnica de Madrid.

## RESEARCH

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### OVERVIEW

	Google Scholar	Web of Science
H-index	9	7
Citations	238	103

### PAPERS IN JCR-INDEXED JOURNALS

- B. Mihaljević, C. Bielza, and P. Larrañaga. Bayesian networks for interpretable machine learning and optimization. *Neurocomputing*, 456:648–665, 2021
- B. Mihaljević, P. Larrañaga, and C. Bielza. Comparing the electrophysiology and morphology of human and mouse layer 2/3 pyramidal neurons with Bayesian networks. *Frontiers in Neuroinformatics*, 15:3, 2021. doi: 10.3389/fninf.2021.580873. URL <https://www.frontiersin.org/article/10.3389/fninf.2021.580873>
- B. Mihaljević, P. Larrañaga, R. Benavides-Piccione, J. DeFelipe, and C. Bielza. Comparing basal dendrite branches in human and mouse hippocampal CA1 pyramidal neurons with Bayesian networks. *Scientific Reports*, 10(1):18592, 2020
- B. Mihaljević, R. Benavides-Piccione, C. Bielza, P. Larrañaga, and J. DeFelipe. Classification of GABAergic interneurons by leading neuroscientists. *Scientific Data*, 6(1):1–6, 2019a
- B. Mihaljević, P. Larrañaga, R. Benavides-Piccione, S. Hill, J. DeFelipe, and C. Bielza. Towards a supervised classification of neocortical interneuron morphologies. *BMC Bioinformatics*, 19(1):511, Dec 2018. ISSN 1471-2105
- B. Mihaljević, C. Bielza, and P. Larrañaga. bnclassify: Learning Bayesian network classifiers. *The R Journal*, 10(2):455–468, Dec. 2018b. URL <https://doi.org/10.32614/RJ-2018-073>

- B. Mihaljević, R. Benavides-Piccione, C. Bielza, J. DeFelipe, and P. Larrañaga. Bayesian network classifiers for categorizing cortical GABAergic interneurons. *Neuroinformatics*, 13(2):192–208, 2015a
- B. Mihaljević, R. Benavides-Piccione, L. Guerra, J. DeFelipe, P. Larrañaga, and C. Bielza. Classifying GABAergic interneurons with semi-supervised projected model-based clustering. *Artificial Intelligence in Medicine*, 65(1):49–59, 2015b
- B. Mihaljević, C. Bielza, R. Benavides-Piccione, J. DeFelipe, and P. Larrañaga. Multi-dimensional classification of GABAergic interneurons with Bayesian network-modeled label uncertainty. *Frontiers in Computational Neuroscience*, 8:150, 2014

## BOOK CHAPTERS

- B. Mihaljević, C. Bielza, and P. Larrañaga. Learning Bayesian network classifiers with completed partially directed acyclic graphs. In V. Kratochvíl and M. Studený, editors, *Proceedings of the Ninth International Conference on Probabilistic Graphical Models*, volume 72 of *Proceedings of Machine Learning Research*, pages 272–283, Prague, Czech Republic, 11–14 Sep 2018a
- B. Mihaljevic, P. Larrañaga, and C. Bielza. Augmented Semi-naive Bayes Classifier. In C. Bielza, A. Salmerón, A. Alonso-Betanzos, J. I. Hidalgo, L. Martínez, A. Troncoso, E. Corchado, and J. M. Corchado, editors, *Advances in Artificial Intelligence*, pages 159–167, Berlin, Heidelberg, 2013b. Springer Berlin Heidelberg. ISBN 978-3-642-40643-0

## RESEARCH STAYS

- A three-month stay (2016/01 to 2016/04) with the group of Sean Hill at the Blue Brain Project at École Polytechnique Fédérale de Lausanne, Switzerland. The stay resulted in a joint publication in *BMC Bioinformatics*.

## WORKSHOP PAPERS & CONFERENCE ABSTRACTS

- B. Mihaljević, P. Larrañaga, and C. Bielza. Automatic classification of cortical interneuron morphologies. In *Proceedings of the Workshop on Advances and Applications of Data Science & Engineering, Real Academia de Ingeniería*, pages 25–28, Madrid, 2016
- B. Mihaljevic, C. Bielza, and P. Larrañaga. BayesClass: an R package for learning Bayesian network classifiers. *Proceedings of useR!*, page 53, 2013a

## POSTERS

- B. Mihaljević, C. Bielza, and P. Larrañaga. Multivariate comparison of human and mouse pyramidal cell dendritic morphologies. Poster at the 3rd HBP Student Conference On Interdisciplinary Brain Research, Ghent, Belgium, February 2019b
- B. Mihaljević, C. Bielza, and P. Larrañaga. Neuroclassifier: automatic classification of cortical gabaergic interneurons. Poster at the 2nd Human Brain Project Education Workshop: Future Medicine: Medical Intelligence for Brain Diseases, Centre Hospitalier Universitaire Vaudois, Laussane, March 2015

## PROJECTS

2023 - 2026	Estimation of Distribution Algorithms in Machine Learning and Optimization
2021 - 2024	Estadística infinito-dimensional: modelos matemáticos y computación (PID2019-109387GB-I00)
2020 - 2021	BAYES-CLIMA-NEURO: Inteligencia artificial para desarrollar sistemas de predicción climática
2020 - 2021	BAYESTREAMS: Redes Bayesianas para flujos de datos continuos (PID2019-109247GB-I00)
2018 - 2020	Human Brain Project SGA2 “Machine learning-based comparative studies of microanatomy and physiology of mice and humans”.
2016 - 2019	Avances en clasificación Multidimensional y detección de Anomalías con redes Bayesianas (TIN2016-79684-P)
2016 - 2018	Human Brain Project SGA1 “Analysis of microanatomical data”
2016 - 2018	Human Brain Project SGA1 “Machine learning and statistical methods for modeling cellular and subcellular morphologies”
2014 - 2018	Conceptos y Aplicaciones de los Sistemas Inteligentes (CASI-CAM-CM S2013/ICE-2845)
2014 - 2016	Aprendizaje de redes Bayesianas con variables sin y con direccionalidad para descubrimiento de asociaciones, predicción multi-respuesta y clustering (TIN2013-41592-P)
2012 - 2018	Convenio de colaboración para la ejecución del proyecto Blue Brain (C080020-09)
2012 - 2013	Red Temática Española para el Avance y la Transferencia de la Inteligencia Computacional Aplicada (TIN2011-14083-E)
2010 - 2013	Minería de datos con PGMS: Nuevos algoritmos y aplicaciones (TIN2010-20900-C04-04)

## TEACHING

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At Universidad Politécnica de Madrid unless otherwise noted.

2023 - 2024	<b>Probability and Statistics II</b> <i>BSc in Software Engineering</i>
2023 - 2024	<b>Probability and Statistics I</b> <i>BSc in Software Engineering</i>
2023 - 2024	<b>Explainable Artificial Intelligence</b> <i>MSc in Artificial Intelligence</i>
2022 - 2024	<b>Machine Learning</b> <i>MSc in Computational Biology</i>
2022 - 2024	<b>Machine Learning I</b> <i>BSc in Data Science and Artificial Intelligence</i>
2022 - 2023	<b>Machine Learning II</b> <i>BSc in Data Science and Artificial Intelligence</i>
2022 - 2023	<b>Logic</b> <i>BSc in Software Engineering</i>
2021 - 2022	<b>Statistics</b> <i>BSc in Biology</i> Universidad Autónoma de Madrid
2021	<b>Bayesian networks</b> <i>Diploma in Applied Artificial Intelligence</i> Universidad Católica del Norte (Chile)
2020 - 2022	<b>Probability and Statistics</b> (Coordinator) <i>BSc in Software Engineering</i> Universidad Autónoma de Madrid
2019 - 2020	<b>Data Mining</b> <i>BSc in Software Engineering</i>
2019 - 2020	<b>Bayesian networks</b> <i>MSc in Data Science</i>
2019 - 2020	<b>Machine Learning</b> <i>MSc in Data Science</i>
2019 - 2020	<b>Machine Learning</b> <i>MSc in Computational Biology</i>
2019 - 2020	<b>Machine Learning</b> <i>EIT Health MSc in Health &amp; Medical Data Analytics</i>
2016 - present	<b>Supervised Learning</b> <i>MSc in Artificial Intelligence Research</i> Universidad Internacional Menéndez Pelayo (UIMP) and Asociación Española para la Inteligencia Artificial (AEPIA)

## SUPERVISED MASTER'S / BACHELOR FINAL PROJECTS

At Universidad Politécnica de Madrid unless otherwise noted.

2022 - 2023	<b>Desarrollo de una Aplicación Móvil para Jugar Jamb (una Variante del Juego Yahtzee)</b> Hongfei Wu <i>BSc in Software Engineering</i>
2022 - 2023	<b>Análisis e impacto de datos faltantes en modelos de machine learning</b> Lucas Camarena <i>MSc in Data Science</i>
2022 - 2023	<b>Analysis of cognitive domains in mild cognitive impairment and Alzheimer's disease using a graph theory approach</b> Ana Solbas Casajús <i>MSc in Computational Biology</i>
2022 - 2023	<b>Use of supervised learning to predict suicidal and non-suicidal self harm risk</b> Nicole Alexandra Frontero <i>MSc in Computational Biology</i>
2021 - 2022	<b>Modelos gráficos gaussianos</b> Jesús Morato <i>BSc in Mathematics</i> Universidad Autónoma de Madrid
2021 - 2022	<b>Estimación de máxima verosimilitud para modelos gráficos gaussianos</b> Daniel Brito Sotelo <i>BSc in Mathematics</i> Universidad Autónoma de Madrid
2019 - 2020	<b>Extending the bnclassify R package: Bayesian Network Classifiers with Continuous Variables</b> Shanshan Cheng <i>MSc in Data Science</i>
2019 - 2020	<b>Redes Bayesianas en R: análisis de los paquetes software disponibles</b> Luis Eduardo Angulo Montes <i>MSc in Data Science</i>
2019 - 2020	<b>Extensión del paquete bnclassify para clasificadores basados en redes bayesianas</b> Oscar Gonzalez Castaño <i>MSc in Artificial Intelligence Research</i> Universidad Internacional Menéndez Pelayo (UIMP) and Asociación Española para la Inteligencia Artificial (AEPIA)
2019 - 2020	<b>Corrección de errores de OCR de Google de documentos en castellano</b> Alexander Gutiérrez Saavedra <i>MSc in Artificial Intelligence Research</i> Universidad Internacional Menéndez Pelayo (UIMP) and Asociación Española para la Inteligencia Artificial (AEPIA)

## MACHINE LEARNING AND ADVANCED STATISTICS SUMMER SCHOOL, UNIVERSIDAD POLITÉCNICA DE MADRID

A total of 105 lecture hours.

2023	<b>Explainable Machine Learning</b> 7.5 hours
2023	<b>Supervised Classification</b> 5 hours
2015 - 2019, 2023	<b>Bayesian networks</b> 24 hours
2014 - 2019, 2023	<b>Feature subset selection</b> 55.5 hours
2013 - 2015	<b>Bayesian network classifiers</b> 13 hours

## COURSES AND TUTORIALS

A total of 25 lecture hours.

2022/10	<b>Inferencia causal: una aproximación aplicada</b> BBVA AI FACTORY, S.L, Madrid, 4 hours
2020/10	<b>Bayesian Classifiers tutorial</b> 19th Mexican International Conference of Artificial Intelligence, Online, 1.5 hours
2019/06	<b>A workshop on Bayesian networks</b> Analyx sp. z o.o. sp. k., Poznan, Polonia, 7 hours
2018/11	<b>Redes Bayesianas con R</b> X Jornadas de Usuarios de R, Facultad de Economía y Empresa, Universidad de Murcia, Murcia, 2.5 hours
2018/10	<b>Redes Bayesianas con R</b> I Congreso Internacional de Computación e Innovación Tecnológica, Universidad Nacional José María Arguedas, Andahuylas, Perú, 3 hours
2014/12	<b>Bayesian networks</b> Data Mining for Efficient Recommendations and Predictions training initiative, Fundación Barcelona Digital , Barcelona, 4 hours
2014/03	<b>Bayesian networks</b> Ingeniería de datos: una visión introductoria, Real Academia de Ingeniería, Madrid, 3 hours

## SERVICE TO THE ACADEMIC COMMUNITY

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### PROGRAM COMMITTEE

- The 11th International Conference on Probabilistic Graphical Models (PGM 2022), October 5 – 7, 2022, Almería (Spain). <https://www2.ua1.es/pgm2022>
- 8th IEEE International Conference on Data Science and Advanced Analytics (DSAA 2021), October 6 –9, 2021, Porto (Portugal). <https://dsaa2021.dcc.fc.up.pt/>
- 10th International Conference on Computing and Informatics in Northern Chile (INFONOR-Chile 2019), August 21–23, 2019, Antofagasta (Chile). <http://infonor2019.net/>

### JOURNAL REFEREE

*Number of papers reviewed given in parentheses.*

- Journal of Machine Learning Research (1), Machine Learning (1), Neuroinformatics (1), PLOS ONE (2), IEEE Access (1), Journal of Alzheimer's Disease (2), International Journal of Approximate Reasoning (1), SoftwareX (1)

### INVITED TALKS

- **Redes Bayesianas: teoría y aplicaciones XII Jornada FuzzyMAD**, Universidad Complutense de Madrid, Madrid (2019)

### OUTREACH

- **Cintas, puentes y poliedros** workshop *XXI Semana de la Ciencia y de la Innovación de Madrid (Madrid Region Science Week)*, together with Adolfo Quirós, Universidad Autónoma de Madrid.
- **Redes Bayesianas: teoría y aplicaciones I Congreso Internacional de Computación e Innovación Tecnológica**, Andahuaylas (Perú) (2018)
- **Machine Learning in Neuroscience 4th IEEE Iberian Student Branch Congress**, Madrid (2015)

### PHD THESIS COMMITTEE

- Carlos Puerto Santana, Universidad Politécnica de Madrid, 2023/03
- Fernando Rodriguez, Universidad Politécnica de Madrid, 2021/11
- Marco Benjumeda, Universidad Politécnica de Madrid, 2019/07
- Sergio Luengo-Sanchez, Universidad Politécnica de Madrid, 2019/09

### MANAGEMENT EXPERIENCE

- |             |   |
|-------------|---|
| 2014 - 2020 | Coordinating the participation of the Computational Intelligence Group within the Human Brain Project                             |
| 2014 - 2019 | Coordinating the Advanced Statistics and Data Mining summer school. School of Computer Science, Universidad Politécnica de Madrid |

## PRIVATE SECTOR

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### PROJECTS

2024	Fintrust Partners, Pilot project for automating report generation with Power BI
2024	Optionline, Bayesian Networks for modelling deforestation
2023	Datais / Visualitics Partners, Report on MLOps methods and tools

### EXPERIENCE

2019-2020	Freelance data scientist (Tinsa Digital)
2010-2011	Freelance software developer (Wallmart Chile, Penta Bank, among others) <i>Developed Java web-based applications</i>
2010	Software developer. Nachsitzen <i>Co-developed a website prototype with Python and Django</i>
2009-2010	Software Engineer. Nectia S.A. <i>Developed Java web-based applications</i>
2007-2008	Software Engineer. Coasin <i>Developed Java-based mobile applications. In charge of a junior software developer</i>
2006-2007	Software Developer. Synapsis <i>Developed Java-based web applications</i>
2005-2006	Software Developer. Slings S.A. <i>Developed Java-based web applications and an Eclipse plug-in</i>
2004-2005	Assistant Software Developer. Azurian <i>Worked on developing a Java-based invoice system</i>

### SOFTWARE

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- Author and maintainer of bnclassify: an R package for discrete Bayesian network classifiers. <https://cran.r-project.org/web/packages/bnclassify/index.html>. *The package has been downloaded over 54 thousand times (in February 2024) from the RStudio mirror of the Comprehensive R Archive Network (CRAN).*

### SKILLS

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#### PROGRAMMING

R, Java (Sun Certified Programmer), python, bash, C++

#### LANGUAGES

Serbian	Native
Spanish	Bilingual (DELE C2 certificate)
English	Advanced, TOEFL iBT 112/120
Greek	Intermediate