Bojan Mihaljević

Curriculum Vitæ

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Contents

Personal information

Email	b.mihaljevic@upm.es
Website	`https://bmihaljevic.github.io/`
Google Scholar	`https://scholar.google.es/citations?user=o1ZNZlMAAAAJ`
Web of Science	`https://www.webofscience.com/wos/author/record/733648`

Education

2013-2018	**PhD in Artificial Intelligence** *"Contributions to Bayesian network classifiers and interneuron classification". Universidad Politécnica de Madrid* Defended with honours (*Sobresaliente cum laude*).
2011-2013	**MSc in Artificial Intelligence** *Universidad Politécnica de Madrid* Master's thesis defended with honors (*Matrícula de honor*)
2005-2010	**BSc in Computer Science and Business Management** *Universidad Diego Portales* (Chile). One semester (2008/09-2009/01) at *Universidad de Alicante*
2000-2004	*Matematicka Gimnazija* 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 *École Polytechnique Fédérale de Lausanne*, Switzerland
2012	José Cuena award for students with highest marks. *Master in Artificial Intelligence Research*, Universidad Politécnica de Madrid
2003	5th place, National Competition in Informatics for Secondary School Students (Serbia)

POSITIONS HELD

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

RESEARCH

OVERVIEW

	Google Scholar	Web of Science
H-index	10	7
Citations	300	147

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 electophysiology 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 colaboracion para la ejecucion 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

At Universidad Politécnica de Madrid unless otherwise noted.

GRADUATE

2024 - present	**Artificial Intelligence in Neurotechnology** *MSc in Neurotechnology*
2023 - present	**Explainable Artificial Intelligence** *MSc in Artificial Inteligence*
2022 - present	**Machine Learning** (Coordinator) *MSc in Computational Biology*
2021	**Bayesian networks** *Diploma in Applied Artificial Intelligence* Universidad Católica del Norte (Chile)
2019 - 2020	**Bayesian networks** *MSc in Data Science*
2019 - 2020	**Machine Learning** *MSc in Data Science*
2019 - 2020	**Machine Learning** *MSc in Computational Biology*
2019 - 2020	**Machine Learning** *EIT Health MSc in Health & Medical Data Analytics*
2016 - present	**Supervised Learning** *MSc in Artificial Intelligence Research* Universidad Internacional Menéndez Pelayo (UIMP) and Asociación Española para la Inteligencia Artificial (AEPIA)

UNDERGRADUATE

2023 - present	**Probability and Statistics II** *BSc in Software Engineering*
2023 - present	**Probability and Statistics I** *BSc in Software Engineering*
2022 - present	**Machine Learning I** *BSc in Data Science and Artificial Intelligence*
2022 - present	**Machine Learning II** *BSc in Data Science and Artificial Intelligence*
2022 - 2023	**Logic** *BSc in Software Engineering*
2021 - 2022	**Statistics** *BSc in Biology* Universidad Autónoma de Madrid
2020 - 2022	**Probability and Statistics** (Coordinator) *BSc in Software Engineering* Universidad Autónoma de Madrid
2019 - 2020	**Data Mining** *BSc in Software Engineering*

SUPERVISED MASTER'S / BACHELOR FINAL PROJECTS

At Universidad Politécnica de Madrid unless otherwise noted.

2023 - 2024	**Previsión del Precio SPOT en el Mercado Eléctrico Español con Redes Neuronales** Nicolas Vega Muñoz *BSc in Data Science and Artificial Intelligence*
2023 - 2024	**Evaluación de rendimiento predictivo de métodos transparentes** Pablo Martin Escobar *BSc in Data Science and Artificial Intelligence*
2023 - 2024	**Diseño y Desarrollo de Modelos de Inteligencia Artificial Explicable para la Identificación de Factores Relevantes en la Calidad de Sueño de Adultos Sanos** Nerea Rodriguez Francisco *BSc in Data Science and Artificial Intelligence*
2023 - 2024	**Empirical Evaluation of Two-sample Hypothesis Testing Methods in Functional Data Analysis** Carlos González-Almansa Laredo *MSc in Data Science*
2023 - 2024	**Towards an Efficient and Accurate Speech Enhancement by a Comprehensive Ablation Study** Lidia Abad *MSc in Artificial Intelligence*
2023 - 2024	**Use of Discrete and Continuous Wavelet Transform in Surface Electromyographic Signals for Human Gait Characterization** Mellado Álvaro *MSc in Computational Biology*
2023 - 2024	**Cognitive Modeling of the Alzheimer's Disease Continuum using Graphical Models** Muñoz Gil Lucia *MSc in Computational Biology*
2022 - 2023	**Desarrollo de una Aplicación Móvil para Jugar Jamb (una Variante del Juego Yahtzee)** Hongfei Wu *BSc in Software Engineering*
2022 - 2023	**Análisis e impacto de datos faltantes en modelos de machine learning** Lucas Camarena *MSc in Data Science*
2022 - 2023	**Analysis of cognitive domains in mild cognitive impairment and Alzheimer's disease using a graph theory approach** Ana Solbas Casajús *MSc in Computational Biology*
2022 - 2023	**Use of supervised learning to predict suicidal and non-suicidal self harm risk** Nicole Alexandra Frontero *MSc in Computational Biology*
2021 - 2022	**Modelos gráficos gaussianos** Jesús Morato *BSc in Mathematics* Universidad Autónoma de Madrid
2021 - 2022	**Estimación de máxima verosimilitud para modelos gráficos gaussianos** Daniel Brito Sotelo *BSc in Mathematics* Universidad Autónoma de Madrid
2019 - 2020	**Extending the bnclassify R package: Bayesian Network Classifiers with Continuous Variables** Shanshan Cheng *MSc in Data Science*
2019 - 2020	**Redes Bayesianas en R: análisis de los paquetes software disponibles** Luis Eduardo Angulo Montes *MSc in Data Science*
2019 - 2020	**Extensión del paquete bnclassify para clasificadores basados en redes bayesianas** Oscar Gonzalez Castaño *MSc in Artificial Intelligence Research* Universidad Internacional Menéndez Pelayo (UIMP) and Asociación Española para la Inteligencia Artificial (AEPIA)
2019 - 2020	**Corrección de errores de OCR de Google de documentos en castellano** Alexander Gutiérrez Saavedra *MSc in Artificial Intelligence Research* 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	**Explainable Machine Learning** 7.5 hours
2023	**Supervised Classification** 5 hours
2015 - 2019, 2023	**Bayesian networks** 24 hours
2014 - 2019, 2023	**Feature subset selection** 55.5 hours
2013 - 2015	**Bayesian network classifiers** 13 hours

COURSES AND TUTORIALS

A total of 25 lecture hours.

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

SERVICE TO THE ACADEMIC COMMUNITY

PROGRAM COMMITTEE

- The 11th International Conference on Probabilistic Graphical Models (PGM 2022), October 5 – 7, 2022, Almería (Spain). `https://www2.ual.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/`

GRANT PROPOSAL EVALUATION

- Project Proposal for the Dutch Research Council (NWO), The Netherlands, 2024

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 MEMBER / REVIEWER

- Alessio Zanga, Università di Milano-Bicocca, 2024/11
- Carlos Villa Blanco, Universidad Politécnica de Madrid, 2024/07
- 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

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) *Developed Java web-based applications*
2010	Software developer. Nachsitzen *Co-developed a website prototype with Python and Django*
2009-2010	Software Engineer. Nectia S.A. *Developed Java web-based applications*
2007-2008	Software Engineer. Coasin *Developed Java-based mobile applications. In charge of a a junior software developer*
2006-2007	Software Developer. Synapsis *Developed Java-based web applications*
2005-2006	Software Developer. Slinges S.A. *Developed Java-based web applications and an Eclipse plug-in*
2004-2005	Assistant Software Developer. Azurian *Worked on developing a Java-based invoice system*

SOFTWARE

- 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

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