

- **Research Scientist** with 15+ years of experience in Artificial Intelligence (AI), both in **reasoning** and **ML**.
- Specializes in **generalization**, **robustness**, and **interpretability** in AI by NeuroSymbolic methods.
- Bridge **business** needs with **AI/ML** technology to develop feasible, scalable solutions that deliver value.
- Used **planning** for improving **generalization** of Large Language Models (LLMs) for **task-oriented dialogue**.

ACADEMIC WORK

- Collaborated on 30+ research publications (see the next page).
- **Google Scholar**: H-index 11, 900+ citations.
- Industrial **invited talk** at the main track of the International Conference on Automated Planning and Scheduling (ICAPS) 2021: *Planning for Controlling Business-to-business Applications*.
- Organized **workshops** at major AI conferences, including six editions of the Planning and Reinforcement Learning workshop (PRL).
- **Reviewed** for top AI conferences (AAAI, NeurIPS, ICLR, ICML, IJCAI, ICAPS, ECAI, AAMAS) and journals (AIJ, JAIR, KBS, ACM-TIST).
- **Influenced** the AI planning community by advocating for the **translation-based approach**.

TECHNICAL SKILLS

- **Coding**: Python, Java, C/C++, Functional languages.
- **ML/NLP tools**: HuggingFace, Pytorch, Pandas, Sklearn.
- **Symbolic AI tools**: Symbolic planners, SAT and constraint solvers, Theorem provers, Parsers.
- **Dev operations**: Linux, Computer clusters, Docker, Git/GitHub.
- **Agile and Project Management** using Jira and similar tools: Ticketing, Sprints, Milestones, Minimum Viable Product (MVP).

EDUCATION

PHD, COMPUTER SCIENCE

Universitat Pompeu Fabra.
Dec 2009 | Barcelona/Spain
Advisor: Prof. Hector Geffner.

BS & MS, COMPUTER SCIENCE

Universidad Simón Bolívar,
Venezuela

LANGUAGES

- **English**: professional.
- **Spanish**: native.
- **French**: elementary.

FUNDAMENTAL AND APPLIED RESEARCH

SERVICENOW RESEARCH | Staff Research Scientist

Mar 2021 – Aug 2023 | Montreal, Canada

- Led the formulation and development of a project studying **fine-tuned LLMs** for **task-oriented dialogue**, featuring slot filling and multiple actions; actively participated in coding and conducting experiments (arXiv 2023).
- Led and supervised work on **embodied taskable agent** in a simulated environment generalizing across skills, object types and relationships using **symbolic planning**, winning the ALFRED challenge 2022 (NeurIPS'23).
- Formulated and led work on **search** methods for **improving ML-based planning** by **approximated** symbolic model (PRL workshop @ IJCAI'22).
- Proposed, developed and advised on using **symbolic planning** for the automatic generation of **dialogue paths** (Proofs of Concept @ ServiceNow).

ELEMENT AI | Applied Research Scientist

Sep 2018 – Feb 2021 | Montreal, Canada

- Developed and transferred the only two technologies from the **AI Core/R&D** team ever delivered to the **Products** team.
- Applied novel **constrained ML inference** in both, no retraining needed.
- For OCR, developed library that achieved **double-digit absolute improvement** in hard cases, while keeping the same performance in other samples.
- For text2sql, formulated and supervised the use of constrained inference of **multi-classifiers using constraint optimization**, replacing ad-hoc heuristics.
- Advised internal customers and products about their **AI strategy**.

NUANCE COMMUNICATIONS | Senior Research Scientist

Nov 2016 – Sep 2018 | Montreal, Canada

- NLP: developed and evaluated components for **Intent similarity** and **Question Answering** on domain-specific content.

REASONING / SYMBOLIC AI | PhD and Postdocs

until 2015, Barcelona and Madrid, Spain

- Formulated principled **translations** between symbolic AI planning problems.
- Solved rich **sequential decision making** problems featuring distribution/set of possible states and the effects of actions and observations.
- Relied on **solvers** for deterministic planning, logic / probabilistic reasoning, compilation to logical circuits and combinatorial optimization.

AWARDS

- **Winner**, ALFRED challenge, Embodied AI workshop @CVPR 2022.
- **IJCAI-JAIR Best Paper Prize 2012** to an "outstanding paper @ JAIR".
- **Dissertation Awards** by the ECCAI (2009) and ICAPS (2010).
- **Winner**, Conformant track of the 5th International **Planning Competition 2006** for number of problems solved given time limit.

PAST ACADEMIC POSITIONS

UNIVERSITAT POMPEU FABRA | Visiting Professor

Jan 2013 – Dec 2015 | Barcelona, Spain

UNIV. CARLOS III DE MADRID | Postdoctoral Scholar

Dec 2010 – Dec 2012 | Madrid, Spain

UNIVERSIDAD SIMÓN BOLÍVAR | Assistant Professor

2008 – 2010 | Caracas, Venezuela

PUBLICATIONS @ INDUSTRY

REFEREED CONFERENCE AND WORKSHOP PAPERS

- X. Liu, H. Palacios, C. Muise. **Egocentric Planning for Scalable Embodied Task Achievement**. NeurIPS 2023, main track, poster.
- R. Assouel, T. Marty, M. Caccia, I. Laradji, A. Drouin, S. Rajeswar, H. Palacios, Q. Cappart, D. Vazquez, N. Chapados, M. Gasse, A. Lacoste. **The Unsolved Challenges of LLMs in Open-Ended Web Tasks: A Case Study**. NeurIPS 2023 Foundation Models for Decision Making Workshop. 2023.
- M. Greco, A. Torralba, J. Baier, H. Palacios. **Scaling up ML-based Black-box Planning with Partial STRIPS Models**. IJCAI Planning and Reinforcement Learning (PRL) workshop. 2022. arXiv preprint arXiv:2207.04479.

PAPERS IN PROGRESS

- S. Raimondo, C. Pal, X. Liu, D. Vazquez, H. Palacios. **Improving Generalization in Task-oriented Dialogues with Workflows and Action Plans**. arXiv preprint arXiv:2306.01729. 2023.

JOURNAL PAPERS

- A. Niveau, H. Palacios, S. Scheck, B. Zanuttini. **A Knowledge Compilation Perspective on Queries and Transformations for Belief Tracking**. Annals of Mathematics and Artificial Intelligence. 2023. **Accepted**.

PATENTS

- H. Palacios, P. Noël. **Systems and methods for enforcing constraints in character recognition**. Patent US11615260B2. Issue date: 28 Mar 2023. <https://patents.google.com/patent/US11615260B2>.
- P. Noël, H. Palacios, T. Moisan. **Systems and methods for using constraints to generate database queries**. Patent US20230128290A1. Issue date: 27 Apr 2023. <https://patents.google.com/patent/US20230128290A1>.
- H. Palacios, P. Noël. **Systems and methods for enforcing constraints to predictions**. Patent US20220101162A1. Issue date: 31 Mar 2022. <https://patents.google.com/patent/US20220101162A1>.
- T. Scholak, L. Zamparo, H. Palacios, K. Legault, P. Noël, K. Majewski. **Method and system for improving quality of a dataset**. Patent US20210240680A1. Issue date: 5 Aug 2021. <https://patents.google.com/patent/US20210240680A1>.

EDITOR / ORGANIZER

- Co-organizer of Workshop series on Planning and Reinforcement Learning (PRL) ICAPS 2020, 2021, 2022, IJCAI 2022, ICAPS 2023, IJCAI 2023.

SELECTED PUBLICATIONS @ ACADEMIA

PHD THESIS

- H Palacios. **Translation-based approaches to Conformant Planning**. Supervised by Prof. Hector Geffner. Dec 2009. Barcelona, Spain.
 - Honourable Mention at the **2009 Artificial Intelligence Dissertation Award** by the European Coordinating Committee for AI (ECCAI).
 - **2010 Best Dissertation Award** by the International Conference on Automated Planning and Scheduling (ICAPS).

JOURNAL PAPERS

- H. Palacios and H. Geffner. **Compiling Uncertainty Away in Conformant Planning Problems with Bounded Width**. Journal of Artificial Intelligence Research (JAIR). 35: 623-765. 2009. ISSN 1076-9757.
 - **IJCAI-JAIR Best Paper Prize 2012** to an "outstanding paper published in JAIR in the preceding five calendar years".

REFEREED CONFERENCE PAPERS

- A. Albore, H. Palacios and H. Geffner. **Compiling Uncertainty Away in Non-Deterministic Conformant Planning**. European Conference on Artificial Intelligence (ECAI), p. 465-470. ISBN 978-1-60750-605-8. Lisbon, Portugal, August 16-20, 2010.
- B. Bonet, H. Palacios and H. Geffner. **Automatic Derivation of Memoryless Policies and Finite-State Controllers Using Classical Planners**. 19th International Conference on Automated Planning and Scheduling (ICAPS), p. 34-41. ISBN 978-1-57735-406-2. Thessaloniki, Greece, September 19-23, 2009.
- A. Albore, H. Palacios and H. Geffner. **A Translation-based Approach to Contingent Planning**. Int. Joint Conf. on Artificial Intelligence (IJCAI), p. 1623-1628. ISBN 978-1-57735-426-0. Pasadena, California, USA, July 11-17, 2009.
- H. Palacios and H. Geffner. **From Conformant into Classical Planning: Efficient Translations That May be Complete Too**. In Proceedings of the 17th International Conference on Automated Planning and Scheduling (ICAPS), p. 264-271. ISBN 978-1-57735-344-7. Providence, Rhode Island, USA, September 22-26, 2007.
 - Best Student Paper Award at ICAPS 2007.
- H. Palacios, B. Bonet, A. Darwiche, H. Geffner. **Pruning Conformant Plans by Counting Models on Compiled d-DNNF Representations**. In Proceedings of the 15th International Conference on Automated Planning and Scheduling (ICAPS), 2005. p 141-150. ISBN 978-1-57735-220-4. Monterey, California, USA. June 5-10 2005.

OTHER PUBLICATIONS @ ACADEMIA

JOURNAL PAPERS

- V. Agrawal, J. Baier, K. Bekris, Y. Chen, A.S. d'Avila Garcez, P. Hitzler, P. Haslum, D. Jannach, E. Law, F. Lecue, L.C. Lamb, C. Matuszek, H. Palacios, B. Srivastava, L. Shastri, N. Sturtevant, R. Stern, S. Tellex, S. Vassos. **Reports of the AAAI 2012 Conference Workshops**. *AI Magazine*. 33(4): 119-126 (2012). ISSN 0738-4602.

PATENTS

- M. B. Do, H. Palacios, R. Zhou, L. Kuhn, J. de Kleer. **Methods and Systems for Active Diagnosis through Logic-based Planning**. Patent US8145334. Issue date: 27 Mar 2012. (During internship at PARC, formerly Xerox PARC).

REFEREED CONFERENCE PAPERS

- K. Fernandes, J.S. Cardoso, H. Palacios. **Learning and Ensembling Lexicographic Preference Trees with Multiple Kernels**. 2016 International Joint Conference on Neural Networks (IJCNN 2016).
- S. Jimenez, A. Jonsson, H. Palacios. **Temporal Planning With Required Concurrency Using Classical Planning**. 25th International Conference on Automated Planning and Scheduling (ICAPS). Jerusalem, Israel. June 7-11, 2015.
- C. Boutilier, J. Lang, J. Oren, H. Palacios. **Robust Winners and Winner Determination Policies under Candidate Uncertainty**. Twenty-Eighth AAAI Conference on Artificial Intelligence (AAAI). July 27-31, 2014. Québec, Canada.
- J. Hoffmann, N. Fates, H. Palacios. **Brothers in Arms? On AI Planning and Cellular Automata**. European Conference on Artificial Intelligence (ECAI). p. 223-228. ISBN 978-1-60750-605-8. Lisbon, Portugal. August 16-20, 2010.
- B. Bonet, H. Palacios and H. Geffner. **Automatic Derivation of Finite-State Machines for Behavior Control (Nectar Track)**. 24th AAAI conference on Artificial Intelligence (AAAI), p. 1656-1659. ISBN 978-1-57735-463-5. Atlanta, Georgia, USA, July 11-15, 2010
- A. Albore, H. Palacios and H. Geffner. **Fast and Informed Action Selection for Planning with Sensing**. In *Current Topics in Artificial Intelligence*, vol 4788/2007. Selected papers of the 12th Conference of the Spanish Association for Artificial Intelligence (CAEPIA), p. 1-10. ISBN: 978-3-540-75270-7. Salamanca, España. November 12-13, 2007.
- H. Palacios and H. Geffner. **Compiling Uncertainty Away: Solving Conformant Planning Problems Using a Classical Planner (Sometimes)**. In *Proceedings of the 21st National Conference on Artificial Intelligence (AAAI)*, p. 900-905. ISBN 978-1-57735-281-5. , Boston, Massachusetts, USA, July 16-20, 2006.
- H. Palacios and H. Geffner. **Mapping Conformant Planning into SAT through Compilation and Projection**. In *Lecture Notes in Computer Sciences*, vol 4177/2006. Selected papers of the 11th Conference of the Spanish Association for Artificial Intelligence (CAEPIA), 2005. p. 311-320. ISBN 3-540-45914-6. Santiago de Compostela, España, November 16-18, 2005.
 - Best Paper Finalist at CAEPIA 2005.
- H. Palacios and H. Geffner. **Planning as Branch and Bound: A Constraint Programming Implementation**. In *Proceedings of the 28th Latin-American Conference on Informatics (infoUYclei)*, 2002. p. 239-251. ISBN 9974-7704-1-6. Montevideo, Uruguay, November 25-29 2002.

REFEREED WORKSHOPS PAPERS

- D. Furelos-Blanco, A. Jonsson, H. Palacios, S. Jimenez. **Forward-Search Temporal Planning with Simultaneous Events**. ICAPS Workshop on Constraint Satisfaction Techniques for Planning and Scheduling, 2018.
- H. Palacios, A. Albore, H. Geffner. **Compiling Contingent Planning into Classical Planning: New Translations and Results**. In *Proceedings of the Workshop "Models and Paradigms for Planning under Uncertainty: a Broad Perspective"*, ICAPS 2014.
- C. Boutilier, J. Lang, J. Oren, H. Palacios. **Robust Winners and Winner Determination Policies under Candidate Uncertainty**. Fourth International Workshop on Computational Social Choice, 2012.
- H. Palacios and H. Geffner. **Compiling Uncertainty Away: Solving Conformant Planning Problems Using a Classical Planner (Sometimes)**. In *Proceedings of the Workshop on Planning Under Uncertainty and Execution Control for Autonomous Systems*, ICAPS 2006.
- H. Palacios and H. Geffner. **Mapping Conformant Planning into SAT through Compilation and Projection**. In *Proceedings of the 1st International Workshop on Quantification in Constraint Programming held during the International Conference on Principles and Practice of Constraint Programming (CP)*, 2005.

EDITOR / ORGANIZER

- Papers from the 2012 AAAI Workshop "Problem Solving Using Classical Planners". H. Palacios, P. Haslum, J. Baier. 98 pp. 2012. ISBN 978-1-57735-577-9.
- Proceedings of the ICAPS'10 workshop on Planning and Scheduling Under Uncertainty (13 May 2010), Bidot J., Bryce D., Buffet O., Palacios H., Sanner S. (Editors). 2010.