

- **Research Scientist** with 15+ years in AI, focusing on **ML**, **generative models**, and **symbolic planning**.
- Improved **generalization** in Large Language Models (LLMs) for **task-oriented dialogue** using **planning**.
- Proficient at evaluating the **generalization** and **robustness** of AI methods across domains and distributions.
- Utilize **NeuroSymbolic methods** to enhance **generalization**, **robustness**, and **interpretability**.
- Bridge **business** needs with **AI/ML** technology to develop feasible, **scalable**, high-value solutions.

## ACADEMIC WORK

- **Collaborated** on over 30 research publications (see the next page).
- **Google Scholar**: H-index 11, 900+ citations.
- Appointed **Area Chair** for NeurIPS 2024 and **Action Editor** of TMLR.
- **Reviewed** for top AI conferences (AAAI, NeurIPS, ICLR, ICML, IJCAI, ICAPS, ECAI, AAMAS) and journals (AIJ, JAIR, KBS, ACM-TIST).
- Organized **workshops** at major AI conferences, including six editions of the Planning and Reinforcement Learning (RL) workshop (PRL).
- Delivered an **industrial invited talk** at the International Conference on Automated Planning and Scheduling (ICAPS) 2021 on **Planning for Controlling Business-to-business Applications**.
- **Influenced** the AI planning community by advocating for the **translation-based approach**.

## TECHNICAL SKILLS

- **Coding**: Python, Java, C++, C, Functional languages.
- **ML/NLP tools**: Hugging Face, Pandas, Pytorch, Scikit-learn.
- **Symbolic AI tools**: Symbolic planners, SAT and constraint solvers, Combinatorial Optimization, 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.

## LANGUAGES

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

## FUNDAMENTAL AND APPLIED RESEARCH

### ATS SOFTWARE | Lead Machine Learning Engineer

Aug 2024 – present | remote, Ontario, Canada

- Lead team for developing a new AI pipeline for entity extraction and linking, serving the construction industry. High-recall for human confirmation.

### INDEPENDENT RESEARCHER | Academic collaborations and service

Jan 2024 – July 2024 | Montreal, Canada

### SERVICENOW RESEARCH | Staff Research Scientist

Mar 2021 – Aug 2023 | Montreal, Canada

- Led and co-led **three research projects** with up to **five members** each.
- Led the conception and development of a project on **fine-tuned LLMs** and **prompting** for **task-oriented dialogue**, featuring slot filling and multiple actions per task; actively contributing to coding (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 automatic generation of interactive **dialogue paths** (Proofs of Concept @ ServiceNow).

### ELEMENT AI | Applied Research Scientist

Sep 2018 – Feb 2021 | Montreal, Canada

- Invented **constrained ML inference** and applied it to OCR and text2sql, aligning with **Products'** needs, improving performance without additional training.
- Delivered the only two technologies ever transferred from **AI Core/R&D** to **Products**, collaborating with the **development and architecture teams**:
- **OCR**: Developed a library yielding **double-digit absolute improvement** in challenging cases, without deteriorating performance elsewhere.
- **Text2sql**: Led, designed and supervised the use of constrained inference in **multi-classifiers** using **constraint optimization**, replacing ad-hoc heuristics.
- **Prior**: Designed the **evaluation** of text2sql LLM model, clarifying its scope.
- Advised product teams on their **AI strategy and roadmap**, derisking their R&D.

### NUANCE COMMUNICATIONS | Senior Research Scientist

Nov 2016 – Sep 2018 | Montreal, Canada

### REASONING / SYMBOLIC AI | PhD and Postdocs

until 2015, Barcelona and Madrid, Spain

- Solved rich **sequential decision making** problems featuring distribution/set of possible states and the effects of actions and observations.

## AWARDS

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

## PAST ACADEMIC POSITIONS

### UNIVERSITAT POMPEU FABRA | Visiting Professor

Jan 2013 – Dec 2015 | Barcelona, Spain

### UNIVERSIDAD CARLOS III DE MADRID | Postdoctoral Scholar

Dec 2010 – Dec 2012 | Madrid, Spain

## 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) series 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.