Héctor Palacios

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- **Research Scientist** with 15+ years of experience in **AI**, both in **symbolic reasoning** and **Machine Learning**.
- Specializes in **generalization**, **robustness**, and intrinsic **explainability** in AI.
- **Led** development of business AI solutions, focusing on identifying and solving the key problems.

EDUCATION

PHD, COMPUTER SCIENCE
Advisor: Prof. Hector Geffner
Universitat Pompeu Fabra
Dec 2009 | Barcelona/Spain

BS & MS, COMPUTER SCIENCE
Universidad Simón Bolívar, Venezuela

ACADEMIC WORK

- **Collaborated** on research leading to 30+ publications. Detail list in the next pages.
- Organized **workshops** at major AI conferences, including six Planning and Reinforcement Learning (PRL).
- **Reviewed** numerous articles 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**.

ACTIVISM / LEADERSHIP

- Facilitated **online activism**, focusing on data crowdsourcing during natural disasters and elections.

PROGRAMMING

Extensive experience in • Python • Java • C/C++ • Functional languages • Linux • Computer clusters • Docker • Version control.

COMMUNICATION

- **Presented** original research at conferences. (See list in next pages).
- **Invited to talks** at ICAPS 2021, Nasa Ames, Univ of Amsterdam.
- **Lectured** hundreds of hours to groups of up to 130 students on AI, logic, and computational logic.

TRAINING

Summer schools: • **Deep learning** 2017 • **Reinforcement learning** 2017.

LANGUAGES

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

INDUSTRIAL ARTIFICIAL INTELLIGENCE

SERVICENOW RESEARCH | Research Scientist
Mar 2021 – Aug 2023 | Montreal, Canada

- *Fundamental* research in AI reasoning and *NeuroSymbolic* methods.
- **Reasoning methods given ML** model output.
  - Embodied taskable agent in a simulated enviroment generalizing across skills, object types and relationships using symbolic planning.
  - Search methods for improving ML-based blackbox planning by human-interpretable approximated symbolic model.
  - ServiceNow POCs on using symbolic planning for the automatic generation of dialogue paths.
- **LLM generalization** for **task-oriented dialogue**.
  - Fined-tuned LLMs for dialogue involving slot filling, multiple action for solving tasks.

ELEMENT AI | Applied Research Scientist
Sep 2018 – Feb 2021 | Montreal, Canada

- *Reasoning given ML model output*. Without additional training, achieved double-digit absolute improvement in hard cases of a OCR task, without losing good performing cases of the pure ML-based model.
- Developed and transfered the only two technologies ever delivered from the *AI Core/R&D* team to the *Products* team, combining reasoning and ML.
- Evaluation of *Question answering* from natural language into *SQL*.
- Consulted for internal customers and products about their *AI strategy*.

NUANCE COMMUNICATIONS | Senior Research Scientist
Nov 2016 – Sep 2018 | Montreal, Canada

ACADEMIC ARTIFICIAL INTELLIGENCE

REASONING / SYMBOLIC AI | Given a description of the problem

- Central approach: translate AI problems into simpler AI ones.
- Solved rich **sequential decision making** problems featuring possible scenarios and effects of actions and observations.
- Used logic / probabilistic reasoning, compilation to logical circuits, combinatorial optimization, and search.

EMPIRICAL | Think, code, measure, analyze, repeat, report

- Designed and ran hundreds of **experiments** over hundreds of problems.
- Programmed **complex algorithms**, requiring millions of object instances.

RESEARCH AWARDS | Papers & Competitions

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

ACADEMIC HISTORY

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

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 ARTICLES

- 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.
- 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".
- 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

- H. Palacios, P. Noël. Systems and methods for enforcing constraints in character recognition. Patent US11615260B2. Issue date: 28 Mar 2023.
- P. Noël, H. Palacios, T. Moisan. Systems and methods for using constraints to generate database queries. Patent US20230128290A1. Issue date: 27 Apr 2023.
- H. Palacios, P. Noël. Systems and methods for enforcing constraints to predictions. Patent US20220101162A1. Issue date: 31 Mar 2022.
- 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.
- 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 ARTICLES

- X. Liu, H. Palacios, C. Muise. Egocentric Planning for Scalable Embodied Task Achievement. NeurIPS 2023, poster.
- 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.
- 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.
- 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
- 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.
- 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. 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 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, 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.
- 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.

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.

REFEREED WORKSHOPS ARTICLES
- 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.** ICAPS Planning and Reinforcement Learning (PRL) workshop. 2022. arXiv preprint arXiv:2207.04479.
- 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
- Co-organizer of Workshop series on Planning and Reinforcement Learning (PRL) ICAPS 2020, 2021, 2022, IJCAI 2022, ICAPS 2023, IJCAI 2023.
- 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.