CURRICULUM VITAE

PERSONAL INFORMATION

Family name, First name: Aloy, Patrick
Researcher unique identifier(s): G Scholar: uhsaahAAAAAJ; ORCID: 0000-0002-3557-0236
Date of birth: 09/09/1972
Nationality: Spanish
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- **FREE CV SUMMARY WITH MENTION OF RESEARCH GAPS (if any)**

Dr Patrick Aloy is an ICREA Research Professor and Principal Investigator of the Structural Bioinformatics and Network Biology lab at the IRB. He has a BSc in Biochemistry, an MSc in Biotechnology and a PhD in Computational Biology from the Universitat Autònoma de Barcelona, Spain, and spent six years as postdoctoral researcher and staff scientist at the European Molecular Biology Laboratory, Heidelberg, Germany. The main goal of his lab is to combine molecular, cell and computational biology to unveil the basic wiring architecture and dynamics of physio-pathological pathways. In the last years he has been developing resources to process, harmonize and integrate bioactivity data on small molecules, providing compound bioactivity descriptors that push the similarity principle beyond chemical properties. Currently, the main research line in the lab is to collect heterogeneous datasets and develop novel methodologies to integrate different layers of regulation to unveil disease signatures. He is convinced that artificial intelligence (AI) will transform drug discovery, as it is reshaping other areas of science and technology, and biological signatures are the key to guide the (semi) automated design of chemical compounds to globally revert disease states, beyond individual targets.

The results of Dr Aloy´s contributions to science are reflected in the **160 articles (34 in the last 5 years)** published in top journals (e.g., *Nature (x2)*, *Science (x2)*, *Cell (x2), Nat Biotechnol (x5), Nat Methods (x2), Nat Commun (x6),* etc), 24 of which as 1st author **and 73 as senior**. The scientific and social relevance of his work can be measured with the **over 19,000 collected citations (h-index = 61)**, **over 130 talks** given in top international meetings and the recurrent invitation to co-organize some of the most prestigious international conferences in the field. In 2007 Dr Aloy **co-founded *Anaxomics Biotech SL***, a life sciences company focused on drug discovery, and he is author of **four patents**, a **copyrighted product** under and he has consulted for many biotech and pharmaceutical companies (e.g GSK, Janssen, Eli-Lilly, etc). Please, see http://sbnb.irbbarcelona.org for further information.

- **EDUCATION**

1991 – 1996 BSc in Biochemistry by the Universitat Autònoma de Barcelona, ES.
1996 – 1998 MSc in Biotechnology by the Universitat Autònoma de Barcelona, ES.
1996 – 2000 PhD in Computational Biology by the Universitat Autònoma de Barcelona, ES.
2001 – 2003 Postdoctoral Researcher (Scientific Assistant) at EMBL-Heidelberg, DE.

- **CURRENT POSITION(S)**

2006 – ICREA Research Professor at IRB Barcelona, ES.

- **PREVIOUS POSITIONS**

2003 – 2006 Staff Scientist at EMBL-Heidelberg, DE.

- **FELLOWSHIPS**

1997 – 2000 FPI PhD fellowship from the Spanish Science Ministry.
1997 EMBO Short Term fellowship.
1998 – 99 EC Marie Curie training grant.
2015 Salvador de Madariaga / Fulbright – Dana-Farber Cancer Institute, US.
2022 Salvador de Madariaga – European Bioinformatics Institute, UK.

- **UP TO TEN REPRESENTATIVE PUBLICATIONS, AS MAIN AUTHOR IN THE LAST 10 YEARS**

– Comajuncosa-Creus, Bertoni, Duran-Frigola, Fernández-Torras, Guitart-Pla, Kurzawa, Locatelli, Martins, Pareja-Lorente, Rojas-Granado, Soler, Viesi & **Aloy**. Integration of diverse bioactivity data into the Chemical Checker compound universe. *Nat Protocols*, In Press (2025). IF: 13.1, Q1.

- Comajuncosa-Creus, Jorba, Barril & **Aloy**. Comprehensive detection and characterization of human druggable pockets through binding site descriptors. *Nat Commun* 15, 7917 (2024). IF: 14.7, Q1.
- Fernández-Torras, Duran-Frigola, Bertoni, Locatelli & **Aloy**. Integrating and formatting biomedical data as pre-calculated knowledge graph embeddings in the Bioteque. *Nat Commun* 13, 5304 (2022). IF: 14.7, Q1.
- Graupera, Isus, Coll, Pose, Díaz, Vallverdú, Rubio-Tomás, Martínez-Sánchez, Huelin, Llopis, Solé, Solà, Fondevila, Lozano, Sancho-Bru, Ginès & **Aloy**. Molecular characterization of chronic liver disease dynamics: From liver fibrosis to acute-on-chronic liver failure. *JHEP Reports* 4, 100482 (2022). IF: 9.5, Q1.
- Pauls, Bayod, Mateo, Alcalde, Juan-Blanco, Sánchez-Soto, Saido, Saito, Berrenguer-Llergo, Stephan-Otto Attolini, Gay, de Oliveira, Duran-Frigola & **Aloy**. Identification and drug-induced reversion of molecular signatures of Alzheimer's disease onset and progression in App^{NL-G-F}, App^{NL-F}, and 3xTg-AD mouse models. *Genome Med* 13, 168 (2021). IF: 10.4, Q1.
- Bertoni, Duran-Frigola, Badia-i-Mompel, Pauls, Orozco-Ruiz, Guitart-Pla, Alcalde, Diaz, Berenguer-Llergo, Brun-Heath, Villegas, García de Herreros & **Aloy**. Bioactivity descriptors for uncharacterized chemical compounds. *Nat Commun* 12, 3932 (2021). IF: 14.7, Q1.
- Mateo, Duran-Frigola, Gris-Oliver, Palafox, Scaltriti, Razavi, Chandarlapaty, Arribas, Bellet, Serra & **Aloy**. Personalized cancer therapy prioritization based on driver alteration co-occurrence patterns. *Genome Med* **12**, 78 (2020). IF: 10.4, Q1.
- Duran-Frigola, Pauls, Guitart-Pla, Bertoni, Alcalde, Amat, Juan-Blanco & **Aloy**. Extending the small molecule similarity principle to all levels of biology. *Nat Biotechnol* 38, 1087 (2020). IF: 33.1, Q1.
- Jaeger, Arroyo, Igea, Alcalde, Cánovas, Orozco, Nebreda & **Aloy.** Pathway crosstalk quantification reveals synergistic drug combinations against breast cancer. *Cancer Res* 77, 459 (2017). IF: 12.5, Q1.
- Mosca, Tenorio-Laranga, Olivella, Alcalde, Ceol, Soler-López & **Aloy**. dSysMap: Exploring the edgetic role of disease mutations. *Nat Methods* 12, 167 (2019). IF: 36.1, Q1.

• MAIN RESEARCH PROJECTS GRANTED IN THE LAST 10 YEARS

Since his incorporation to IRB Barcelona, Dr Aloy has secured over **10M €** **of extramural competitive grants** and salaries, including and ***ERC Consolidator Grant***. Please, find below a selection of the obtained grants as Principal Investigator in the last 10 years. The indicated funding corresponds to the amount received by the SB&NB group.

- *AI-guided design of a chemical toolbox to probe disease biology (AI-ChemToolbox)*. Agencia Estatal de Investigación (PID2023-152296OB-I00) 2025-2028. 262,500€.
- *Causative link between respiratory syncytial virus and chronic lung diseases: Identifying targets for therapy (CLARITY)*. Horizon Europe (101137201) 2024-2028. 1,000,369€.
- *Grups de Recerca Consolidats*. Generalitat de Catalunya (2021 SGR 00876) 2022-2025. 40,000€.
- *IMPaCT Data*. Instituto de Salud Carlos III (IMP/00019) 2021-2024. 100,000€.
- *Formatting biological big data to enable personalized systems pharmacology (PerSysPharm)*. Agencia Estatal de Investigación (PID2020-119535RB-I00) 2022-2024. *305,000€*.
- *Rapid interaction profiling of 2019-nCoV for network-based deep drug-repurpose learning (RiPCoN)*. EC SARS-CoV2 Emergency Call (101003633) 2020-2022. 150,000€.
- *Medicina personalitzada: Valorització d'EGA per a la Industria i la Societat*. Generalitat de Catalunya (001-P-001647) 2019-2021. 90,000€.
- *Human Brain Project: Cluster Emergent del Cervell Humà*. Generalitat de Catalunya (001-P-001682CECH) 2019-2021. 90,000€.
- *Grup de Recerca Consolidad*. Generalitat de Catalunya (2017 SGR 1486) 2017-2020. 40,950€.
- *Plataforma Tecnológica de Investigación en Salud – Bioinformática*. Instituto de Salud Carlos III (PT17/0009/000). 2018-2020. 102,025€.

- *Aproximación de farmacología sistémica para posibilitar el abordaje de enfermedades complejas*. Ministerio de Educación y Ciencia (BIO2016-77038-R) 2017-2019. 290,000€.
- *Desarrollo de nuevas estrategias terapéuticas, basadas en farmacología computacional sistémica, contra la enfermedad de Alzheimer*. Ministerio de Educación y Ciencia (BIO2013-48222-R) 2014-2016. 287,980€.
- *Grup de Recerca Consolidad*. Generalitat de Catalunya (2014 SGR 41) 2014-2016. 28,800€.
- *A systems pharmacology approach to Alzheimer´s disease*. European Research Council - ERC (694144) 2014-2019. 1,300,000€.
- *Early warning signals of ageing in human stem cells and age-related disorders*. European Commission (306240) 2013-2017. 371,000€.
- *Grup de Recerca Emergent; Grup de Recerca Consolidat de la Generalitat de Catalunya*. Generalitat de Catalunya (2009 SGR 1519). 2010-2015. 41,600€.

• GRANTED PATENTS / LICENSE AGREEMENTS / EXAMPLES OF LEADERSHIP IN INNOVATION

In 2007 Dr Aloy co-founded *Anaxomics Biotech SL*, he is author of four patents, a copyrighted product under exploitation and has consulted for many biotech and pharmaceutical companies, and led research projects funded by them (e.g. GSK, Janssen, Almirall, Biersdorf, Eli-Lilly, etc). Dr Aloy is currently consulting for Nuage Therapeutics.

- Coma, **Aloy**, Pujol, Mas, Naval. *New combination therapies for treating ocular disorders*. (2013) US Patent Application No: 61/750,267.
- Coma, **Aloy**, Pujol, Mas, Casas, Navarro, Naval. *New combination therapies for treating nervous system diseases*. (2013) US Patent Application No: 61/754,186.
- Coma, Pujol, Gomis, Oliva, Lleó, **Aloy**, Mas. *New combination therapies for treating neurological disorders*. (2012) US Patent Application No: 13/660,205.
- Mas, Pujol, Farrés, **Aloy**. *Methods and Systems for identifying molecules or processes of biological interest by using knowledge discovery in biological data*. (2010). US Patent Application No: 12/912, 535.
- **Aloy P** & Russell RB. *InterPreTS: Interaction prediction through structure*. (2002). Record number: EMBLEM No 152 (Invention Record & Copyright). Priority country and date: EU – 19.4.2002. Patent owner: EMBLEM Technology Transfer.

• SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

- Dr Aloy has supervised 17 PhDs, 13 of which have already completed and defended their theses. All his PhD students obtained the qualification of Excellent *Cum Laude*, and **3 of them** were distinguished with the **PhD Extraordinary Award** by the Universitat Pompeu Fabra (Miquel Duran-Frigola – 2015, Lídia Mateo – 2019) and the Universitat de Barcelona (Adrià Fernández-Torras – 2023).
- He has also supervised 15 MSc students and 22 postdoctoral fellows, including a Ramón y Cajal, EMBO, Marie Curie and Juan de la Cierva grantees.

• ORGANISATION OF SCIENTIFIC MEETINGS

- BioMed Conference on *AI in Drug Discovery and Biomedicine* (2025). Barcelona, ES.
- (3x) *Proteomics and Protein Structure Meeting* of the Societat Catalana de Biologia (2022-2024). Barcelona, ES.
- *Generative AI Session* in the EuroQSAR meeting (2024). Barcelona, ES.
- *Systems Biology Track*, European Conference on Computational Biology (2022). Sitges, ES.
- *Systems Biology Track*, European Conference on Computational Biology (2020). Virtual.
- EMBO conference on *Expanding the druggable proteome with chemical biology* (2020). Heidelberg, DE.
- *EMBO Alumni meeting* (2020). Barcelona, ES.
- *Bioinformatics and Genomics Meeting* of the Societat Catalana de Biologia (2018). Barcelona, ES.
- Fundación R Areces meeting on *Protein Interactions and Complexes* (2015). Barcelona, ES
- ICREA Conference on *Network Medicine Approaches to Human Disease* (2011). Barcelona, ES.

- (3x) Cold Spring Harbor Laboratory meeting on *Systems Biology: Networks* (2010–2013). Cold Spring Harbor, US.
- *Exascale challenges in computational biology* (2010). Barcelona, ES.
- BioMed Conference on *Targeting and tinkering with interaction networks* (2008). Barcelona, ES.

• INVITED SPEAKER PRESENTATIONS AT INTERNATIONAL CONFERENCES

Total Number of invited presentations: >130 invited talks, >25 in the last 5 years. Find below a selection of recent conferences where Dr Aloy delivered talks as Invited Speaker.

- Protein Modules Conference (sep 2024). Seefeld in Tirol. AT.
- International Conference on Systems Biology – ICSB (Jul 2024). Montreal, CA.
- ELIXIR All Hands Meeting (Jun 2024). Uppsala, SE.
- Precision Tox Meeting (Apr 2023). Birmingham, UK.
- International Conference on Systems Biology – ICSB (Oct 2022). Berlin, DE.
- European Conference on Computational Biology – ECCB (Sep 2022). Sitges, ES.
- From Algorithms to Discovery in Biology and Medicine (Jul 2022). San Francisco, US.

• INSTITUTIONAL RESPONSIBILITIES AND REVIEWING ACTIVITIES

2024 –	Scientific Co-Lead Cell and Molecular Research. ELIXIR Europe.
2021 –	Coordinator of the Proteomics Section of Societat Catalana de Biologia, ES.
2020 –	Chief Editor of Frontiers in Bioinformatics (Network Bioinformatics), CH.
2019 –	Scientific Advisory Board of BioHealth Excellence campus of the Uni Graz, AT.
2019 –	Coordinator of the Computational Biology Node, IRB Barcelona, ES.
2019 – 2024	Advisory Committee for the InterPro/Pfam resources, at the EBI-EMBL, UK.
2019 – 2022	Advisory Committee for Swiss National Science Foundation (SNSF), CH.
2011 – 2014	Coordinator of Life Sciences of the Spanish Supercomputing Network, ES.
2006 –	Member of many Evaluation Committees for the European Commission (EU), DGF (DE), SNSF (CH), Welcome Trust (UK), MRC (UK), NCI (US), AEI (ES), ISCIII (ES), CDTI (ES), etc.
2001 –	*Ad hoc* Reviewer for many scientific journals, including Nature, Science, Cell, Nat Biotechnol, Nat Methods, Nat Commun, PNAS, Genome Research, etc
2006 –	Editorial Board Member of Genome Medicine, Molecular Cell Proteomics, Scientific Data, PLoS Comp Biol, PLoS ONE, Applied Bioinformatics, Evolutionary Bioinformatics Online, Peer J

• MAJOR COLLABORATIONS

Dr Aloy has established many solid and fruitful scientific collaborations within the IRB and with other national and international top institutes. Please, find below some of the most representative.

- Marc Vidal. Charting the human reference interactome. Dana-Farber Cancer Institute and Harvard Medical School. Boston, US.
- Pascal Falter-Braun. Charting virus-host interactions. Helmholtz. Munich, DE.
- Georg Winter. Identification and design of molecular degraders. Center for Molecular Medicine. Vienna, AT.
- Marianne Boes. Identification of relationships between infectious and non-communicable diseases. Utrecht Medical Center. Utrecht, NL.
- Charlie Boone. Charting genetic interactions in yeast and human. Donnelly Center. Toronto, CA.
- Julio Sáez-Rodríguez. Use of knowledge graphs and encoders to generate biomedical descriptors. European Bioinformatics Institute. Hinxton, UK.
- Jolanda van Leeuwen. Identification and prediction of supression mutations in deleterious epistasis. UMass Chan Medical School. Worcester, US.
- Eduard Batlle. Identification of WNT pathway inhibidors. Institute for Research in Biomedicine. Barcelona, ES.
- Raúl Méndez. Postranscriptional regulation of gene expression in NASH. Institute for Research in Biomedicine. Barcelona, ES.
- Ángel Nebreda. Identification of combination therapies against TNBC. Institute for Research in Biomedicine. Barcelona, ES.