Dr Arnau Montagud
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EDUCATION

Ph.D., *Cum Laude* with distinctions, Department of Applied Mathematics, Universitat Politècnica de València, 17 April 2012
M.Sc., Cellular Biology, Universitat de València, 10 October 2007
B.Sc., Biology, Universitat de València, 24 July 2006

RESEARCH EXPERIENCE

Senior researcher, January 2019 – present
Life Sciences department, Barcelona Supercomputing Center, Barcelona, Spain
Principal Investigator: Dr. Alfonso Valencia

Postdoctoral researcher, January 2014 – January 2019
U900, Institut Curie, Paris, France
Principal Investigator: Dr. Emmanuel Barillot
I have been involved in projects with three different types of cancer: breast, medulloblastoma and prostate cancer. I have studied these using four different approaches:

- I used data deconvolution to discover new relevant signatures;
- I used pathway enrichment tools to better describe group patients;
- I built Boolean models, published pipelines and tools to better capture patients' diversity and drug predictions; and
- I co-authored a multiscale modelling framework that combines agent-based and Boolean modelling.

Postdoctoral researcher, May 2012 – January 2014
Institut Universitari de Matemática Pura y Aplicada, Universitat Politècnica de València, València, Spain
Principal Investigator: Prof. Javier F Urchueguía
I worked on the use of multi-objective optimizations on flux balance analysis and on models of the scaling-up of the production of hydrogen in *Synechocystis* sp. PCC6803.
I mentored 5 M.Sc. and 2 Ph.D. students.

Ph.D. student, April 2007 – April 2012
Institut Universitari de Matemática Pura y Aplicada, Universitat Politècnica de València, València, Spain
Advisors: Pedro Fernández de Córdoba (UPV), Kiran R Patil (EMBL) and Javier F Urchueguía (UPV)
I built the first genome-scale metabolic model of *Synechocystis* sp. PCC6803 and I used flux balance analysis to simulate for the first time a single metabolic network under different growth conditions, with completely different flux landscapes. I also proposed several mutants that would enhance the cyanobacterium's potentialities as a production platform. Lastly, I studied the transcriptomics of metabolic changes upon light regime changes.

Ph.D. visiting student at Kiran Raosaheb Patil (DTU) group
September 2008 – January 2009 and March 2010 – September 2010, Technical University of Denmark (DTU), Kongens Lyngby, Denmark

Ph.D. visiting student at Kiran Raosaheb Patil (EMBL) group
September 2010 – February 2011 at EMBL, Heidelberg, Germany

MSc student, September 2006 – October 2007
Universitat de València, València, Spain
Advisors: Pedro Fernández de Córdoba (UPV), Jesús Salgado (UV) and Javier F Urchueguía (UPV)
For my MSc thesis and in the context of an FP6-funded project consortium, I characterized two promoters (pLac and pOmpR) and I helped standardize an expression plasmid in *Synechocystis* sp. PCC6803 that different members of the consortium used later.

MSc visiting student at Peter Lindblad (UU) group
April 2007 – June 2007, Uppsala University, Uppsala, Sweden

TRAINING:

Technical: molecular cloning; cyanobacterium growth; shell, R and python coding (basic & advanced); basics on cluster computing

Transversal: grant writing; interviewing skills; presentations techniques

AWARDS AND HONOURS

2013 – Selected for the programme "Pioneers into Practice" from the EU-funded "Climate KIC"
2013 – Ph.D. thesis with distinctions award, selected as one of the top 50 Ph.D. theses of that year, UPV
2011 – 2nd Price in 5th Valencia IDEA competition in Energy and Environment, Valencia City Council
2011 – Travel grant to attend Synthetic Biology 5.0 in Stanford, USA
2008 – Travel grant to attend Synthetic Biology 4.0 in Hong Kong, China
2007 – Ph.D. fellowship awarded by the Regional Government of Valencia

PUBLICATIONS (CITATIONS BY SCOPUS EXCLUDING SELF-CITATIONS)

1. Antoine Forget, […], **Arnau Montagud**, *et al.* (2018): *Aberrant ERBB4-SRC Signaling as a Hallmark of Group 4 Medulloblastoma Revealed by Integrative Phosphoproteomic Profiling. Cancer Cell*, 34: 379-395.e7. doi:10.1016/j.ccell.2018.08.002
2. Gaelle Letort, **Arnau Montagud**, *et al.* (2018): *PhysiBoSS: a multi-scale agent based modelling framework integrating physical dimension and cell signalling. Bioinformatics*, bty766.
3. Jonas Béal, **Arnau Montagud**, *et al.* (2018): *Instantiation of patient-specific logical models with multi-omics data allows clinical stratification of patients. Under revision in Frontiers in Physiology*
4. **Arnau Montagud**, *et al.* (2017): *Pipeline of logical modelling tools facilitates experimental testing and conclusions. Briefings in Bioinformatics*, bbx163.
5. Filipe Pinto, […], **Arnau Montagud**, *et al.* (2015): *Improving a Synechocystis-based photoautotrophic chassis through systematic genome mapping and validation of neutral sites. DNA Research*, 22 (6): 425-437. ***Citations: 10***
6. **Arnau Montagud**, *et al.* (2015): *Synechocystis sp. PCC6803 metabolic models for the enhanced production of biofuels. Critical Reviews in Biotechnology* 22 (6): 425-437. DOI:10.3109/07388551.2013.829799. ***Citations: 3***
7. Daniel Gamermann, **Arnau Montagud**, *et al.* (2014): *New approach for phylogenetic tree recovery based on genome-scale metabolic networks. Journal of Computational Biology*, 21 (7): 508-19. ***Citations: 2***
8. R.A. Jaime-Infante, […], **Arnau Montagud**, *et al.* (2014): *Herramienta para la optimización de flujos metabólicos en un sistema biológico. Investigación Operacional*, 35 (2): 96-103.
9. Julián Triana, **Arnau Montagud**, *et al.* (2014): *Generation and evaluation of a genome-scale metabolic network model of Synechococcus elongatus PCC7942. Metabolites*, 4 (3): 680-698.
10. Daniel Gamermann, **Arnau Montagud**, *et al.* (2014). *PyNetMet: Python tools for efficient work with networks and metabolic models. Computational and Mathematical Biology*, 3:(5). ISSN: 2219-1402. iConcept Press.
11. Daniel Gamermann, **Arnau Montagud**, *et al.* (2012*): A modular synthetic device to calibrate promoters. Journal of Biological Systems*, 20 (1):37.
12. Miguel Lopo, **Arnau Montagud**, *et al.* (2012): *Experimental and modelling analysis of Synechocystis sp. PCC6803 growth. Journal Molecular Microbiology and Biotechnology*, 22 (2):71-82. ***Citations: 6***
13. Raymari Reyes, Daniel Gamermann, **Arnau Montagud**, *et al.* (2012): *Automation on the Generation of Genome-scale Metabolic Models. Journal of computational biology: a journal of computational molecular cell biology*, 19:1295–306. ***Citations: 7***

14. Filipe Pinto, […], **Arnau Montagud**, *et al.* (2012): *Construction of a chassis for hydrogen production: physiological and molecular characterization of a Synechocystis sp. PCC6803 mutant lacking a functional bidirectional hydrogenase. Microbiology (Reading, England)*, 158:448-464. ***Citations: 18***
15. **Arnau Montagud**, *et al.* (2011): *Flux coupling and transcriptional regulation within the metabolic network of the photosynthetic bacterium Synechocystis sp. PCC6803. Biotechnology Journal*, 6:330-342. ***Citations: 34***
16. Raymari Reyes, […], **Arnau Montagud**, *et al.* (2011): *Desarrollo De Una Plataforma Computacional Para El Modelado Metabólico De Un Microorganismo, Nereis*, 3:25–31. ***Citations: 1***
17. Eugeni Belda, […], **Arnau Montagud**, *et al.* (2011): *Microbial Diversity in the Midguts of Field and Lab-Reared Populations of the European Corn Borer Ostrinia nubilalis. PLoS ONE*, 6:e21751. ***Citations: 29***
18. Cristina Vilanova, […], **Arnau Montagud**, *et al.* (2011): *Aequorin-expressing yeast emits light under electric control. Journal of Biotechnology*, 152:93-5. ***Citations: 2***
19. **Arnau Montagud**, *et al.* (2010): *Reconstruction and analysis of genome-scale metabolic model of a photosynthetic bacterium. BMC Systems Biology*, 4:156. ***Citations: 70***
20. Joaquina Delás, […], **Arnau Montagud**, *et al.* (2009): *Yeast cultures with UCP1 uncoupling activity as a heating device. New Biotechnology*, 26:300-6. ***Citations: 2***
21. Emilio Navarro, **Arnau Montagud**, *et al.* (2009): *Metabolic flux analysis of the hydrogen production potential in Synechocystis sp. PCC6803. International Journal of Hydrogen Energy*, 34:8828-8838 ***Citations: 27***
22. Guillermo Rodrigo*, **Arnau Montagud***, *et al.* (2007): *Vanillin cell sensor. IET Synthetic Biology*, 1:74. ***Citations: 2***

* equal contributions

EDUCATIONAL PUBLICATIONS

1. Montagud, Arnau (2014): *Presente y futuro de los modelos matemáticos en la lucha contra el cáncer*. http://dx.doi.org/10.6084/m9.figshare.1207974.
2. Pitarch, Miguel, **Arnau Montagud**, Emilio Navarro, Pedro Fernández de Córdoba, Javier F Urchueguía (2010). *iGEM: una experiencia educativa única de trabajo en grupos multidisciplinares en el campo de la biologia. Revista de la Facultad de Educación*, 17:57. ISSN 1657-6454
3. Pitarch, Miguel, Cristina Vilanova, Angeles Hueso, Carles Palanca, Guillem Marco, Eduardo Otero, **Arnau Montagud**, et al (2010): *El equipo Valencia-iGEM diseña y construye la primera pantalla biológica. Matematicalia*, 6 (3), september. ISSN 1699-7700

PUBLISHED BOOKS

1. **Montagud, Arnau** (2012): *Modelling and analysis of biological systems to obtain biofuels*. Saarbrücken, Germany: Lambert Academic Publishing. ISBN: 978-3-659-36415-0.
2. **Montagud, Arnau**, Emilio Navarro, Pedro Fernández de Córdoba, and Javier F Urchueguía (2009): Introduction to Synthetic Biology. Valencia, Spain: PoliCLICK. ISBN: 978-84-691-5074-0.
3. Palanca, Carles, Juny Crespo, Cristina Vilanova, Guillem Marco, Sara Rivera, Angeles Hueso, Miguel Pitarch, Eduardo Otero, Jerzy Szablowski, **Arnau Montagud**, Emilio Navarro, Manuel Porcar (2009): Sins, Ethics and Biology. http://dx.doi.org/10.6084/m9.figshare.1206372.

REVIEWER

BMC Systems Biology, PLoS ONE, Scientific Reports, Frontiers in Physiology. Link to Publons profile.

MENTORSHIP

1. Maria Siurana (2017), Ph.D. thesis: *Multiobjective optimization of cyanobacterial metabolic models*. Mathematics Graduate School, UPV. Supervised by Pedro Fernández de Córdoba, Gilberto Reynoso-Meza and **Arnau Montagud**.
2. Julián Triana (2014), Ph.D. thesis: *Model-based analysis and metabolic design of a cyanobacterium for bio-products synthesis*. Mathematics Graduate School, UPV. Supervised by Pedro Fernández de Córdoba, Javier F Urchueguía and **Arnau Montagud**.

3. **Mentoring of M.Sc. students:** Maria Siurana, Julián Triana, R.A. Jaime-Infante, Raymari Reyes, Jorge Garrido

TALKS

"Patient-specific prostate logical models allow clinical stratification of patients and personalized drug treatment", **selected talk** at *Workshop on Logical Modelling of Cellular Networks* at *ECCB 2018: 17th European Conference On Computational Biology*, Athens, Greece, 8 September, 2018

"From genes to pathways: pathway quantification with ROMA", seminar at *GENOPOLE SUMMER SCHOOL 2018: Bioinformatics and Biostatistical tools in medical genomics*, Genopole, Château'form Seine-Port, France, 29 June 2018

"rROMA, a tool for module activity calculation from omics data and networks", tutorial at *3rd Disease Maps Community Meeting*, Institut Curie, Paris, France, 22 June 2018

"Towards patient-specific multi-scale models and data integration for clinical stratification", seminar at Computational Biology group, BSC, Barcelona, Spain, 19 June 2018

"Use of computational methods for logical modelling of biological networks", **invited talks** at *In Silico Systems Biology Training*, EBI, Hinxton, UK, 3 to 8 June 2018

"Instantiation of patient-specific logical prostate models with multi-omics data allows clinical stratification of patients", **selected talk** at *3rd European Conference on Translational Bioinformatics*, PRBB, Barcelona, Spain, 17 April 2018

"Systems Biology of Cancer or How I learned to stop worrying and love the complexity", seminar at Mathematics Graduate School, UPV, València, Spain, 29 September 2017

"Conceptual and computational framework for logical modelling of biological networks deregulated in diseases", **invited talk** at CoLoMoTo bi-annual meeting, ENS, Paris, France, 17 July 2017

"Use of computational methods for logical modelling of biological networks deregulated in diseases", **invited talks** at *3rd Porto Meeting in Mathematics and Biology*, Porto, Portugal, 21 and 22 June 2017

"Modelling and data analyses in Systems Biology of Cancer", **invited talk** at Institut Universitari de Matemática Pura i Aplicada, UPV, València, Spain, 28 March 2017

"ICA uncovers clinical traits that cause breast cancer stratification", **selected talk** at *1st Systems biology of Transcription Regulation Workshop* at *17th International Conference on Systems Biology* (ICSB), Barcelona, Spain, 15 September 2016

"Modelling intratumoral heterogeneity with multi-scale models", seminar at INRIA, Paris, France, 27 June 2016

"Analyse moléculaire de la progression tumorale des carcinomes canalaires in situ du sein", **invited talk** at *Séminaire de recherche translationnelle*, Institut Curie, Paris, France, 6 October 2015

"INVADE – Multiscale mathematical modelling of tumour invasion", **invited talk** at *ABCday*, Institut Curie, Paris, France, 15 May 2015

"Modelling tumour invasion", seminar at Institut Pasteur, Paris, France, 2 April 2015

"Modelling tumour invasion", **invited talk** at Center for Research and Interdisciplinarity's FdV Doctoral School, Paris, France, 9 April 2015

"Use of mathematical models in cancer research", seminar at CNAM, Paris, France, 10 June 2014

ORGANISATION OF INTERNATIONAL CONFERENCES

Co-organiser of *2nd Systems biology of Transcription Regulation Workshop* at *18th International Conference on Systems Biology* (ICSB), Lyon, France, 27th October 2018.

PARTICIPATION WITH POSTER PRESENTATIONS IN INTERNATIONAL CONFERENCES

2018: ECTB'18, Barcelona, Spain; ECCB'18, Athens, Greece (poster accepted)

2017: ISMB ECCB'17, Prague, Czech Republic

2016: Applied bioinformatics in life sciences, Leuven, Belgium; XIII Symposium on Bioinformatics, València, Spain; ICSB'16, Barcelona, Spain

2015: ISMB ECCB'15, Dublin, Ireland; CRCLyon, Lyon, France; ICSB'15, Singapore, Singapore
2014: ECCB'14, Strasbourg, France
2011: SB5.0, Stanford, USA; ICSB'11, Heidelberg, Germany
2010: H2ase 2010, Uppsala, Sweden; Industrial Systems Biology, Gothemburg, Sweden
2009: 2nd European Conference on Synthetic Biology, Sant Feliu de Guixols, Spain
2008: IEA meeting, Porto, Portugal; SB4.0, Hong Kong, China;
2007: 1st European Conference on Synthetic Biology, Sant Feliu de Guixols, Spain

PARTICIPATION IN COMPETITIVE PROJECTS

1. PrECISE (Personalized Engine for Cancer Integrative Study and Evaluation)
   PI: Dr. J. Sáez-Rodríguez; PI Institut Curie group: Dr. L. Calzone, **Arnau Montagud (acting IC PI)**
   Funding: H2020 EU; Duration: January 2015 to December 2018
2. M5 (Multi-scale modelling of molecular mechanisms in medulloblastoma)
   PI: Dr. O. Ayrault; PI Institut Curie group: Dr. E. Barillot
   Funding: AVIESAN, Institut National du Cancer; Duration: December 2015 to December 2017
3. INVADE (Multiscale mathematical modelling of tumour invasion)
   PI: Dr. E. Barillot
   Funding: ITMO Cancer 2012; Duration: November 2013 to November 2016
4. CyanoFactory (Design, construction and demonstration of solar biofuel production using novel (photo)synthetic cell factories)
   PI: Prof. P. Lindblad; PI UPV group: Prof. J. Urchueguía
   Funding: FP7 EU; Duration: December 2012 to December 2015
5. Integración de Bases de Datos Biológicas con Nuevas Herramientas de Cómputo en Biología Sintética Orientadas a la Producción de Biocombustibles.
   PI: Prof. P. Fernández de Córdoba
   Funding: Min de Ciencia e Innovación, España; Duration: January 2010 to December 2012
6. Computational Assisted Modelling of Synechocystis PCC6803 Growth in order to Produce a Chassis for Hydrogen Production
   PI: Prof. J. F. Urchueguía
   Funding: Min de Ciencia, España; Duration: January 2009 to December 2010
7. Desarrollo de nuevas tecnologías ómicas y su aplicación en la biosíntesis de etanol
   PI: Prof. P. Fernández de Córdoba
   Funding: PROFIT, Min de Ciencia e Innovación; Duration: January 2008 to December 2009
8. TARPOL (Targeting environmental pollution with engineered microbial systems á la carte)
   PI: Prof. A. Moya; PI UPV group: Prof. J. Urchueguía
   Funding: FP7 EU; Duration: January 2008 to December 2010
9. BIOMODULARH2 (Engineered Modular Bacterial Photoproduction of Hydrogen)
   PI: Dr. A. Jaramillo: PI UPV group: Prof. P. Fernández de Córdoba and Prof. J. Urchueguía
   Funding: NEST PATHFINDER Programme, FP6 EU; Duration: January 2007 to December 2009

TECHNOLOGICAL RESULTS

Logical modelling pipeline with tutorials, Docker container and descriptions of tools present in Montagud *et al.* (2017) *Briefings in Bioinformatics*: https://github.com/sysbio-curie/Logical_modelling_pipeline
PhysiBoSS code examples and analyses scripts: https://github.com/sysbio-curie/PhysiBoSS
Tools to characterize a Boolean model with patient's data present in Béal *et al.* (2018) *in press at Frontiers in Physiology*: https://github.com/sysbio-curie/Instantiation_logical_models

EXTRACURRICULAR ACTIVITIES

2015 – present, Postdocs' representative at U900 council governing body
2007 – 2013, advisor member of Valencia's iGEM team, international Synthetic Biology competition
2006, student member of Valencia's iGEM team

LANGUAGES

Catalan – Native; Spanish – Native; English – Proficient; French – Proficient