Thomas Dupic

PhD

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Research Experience

2025-present **Junior group leader**, *Centre d'Immunology Marseille-Luminy*, Affinities in the immune repertoire.

2020-2024 **Post-doctoral researcher**, *Desai Lab (Harvard, USA), with Michael Desai*, Antibodies Evolution, Experimental and computational study of the affinity maturation landscape.

2018-2020 **Post-doctoral researcher**, *LPENS (ENS, France), in the group of Aleksandra Walczak and Thierry Mora*, structure and generation of the immune repertoire, relationship and interactions between the two polymer chains composing the T-cell receptor.

2015-2018 **Doctoral student**, *LPTHE (UPMC, France) supervised by Yacine Ikhlef and Benoît Estienne*, loop models and conformal field theories, study of a particular class of two-dimensional polymer models at criticality, entanglement entropy in critical non-unitary systems.

2015 **Internship at the LPTHE (UPMC)**, *with B. Estienne and Y. Ikhlef.*

2014 **Internship at the LPS (ENS), ABCD group**, *with J-F. Allemand*, Optical microscopy, tracking of a magnetic bead through diffraction patterns, Building of an optical setup .

2013 **Internship at the disordered system group in King's College London**, *with I.P. Castillo*, Eigenvalues of product of random matrices ; behaviour of vicious brownian walkers.

2012 **Internship at the laboratory Kastler Brossel**, *non-destructive quantum measurement : photons and atoms in cavity with M.Brune and P. Rouchon.*

Education

2013 **Master ICFP, Theoretical Physics**.

2012 **Master ICFP**.

2011 **Bachelors of Science in Mathematics and in Physics**.

2010-2014 **École normale supérieure (ENS, Paris)**.

2009-2010 **Classe Préparatoire (Nantes)**.

2009 **A-levels with First Class Honors**.

Competences

Computers **Python, C/C++, Unix, Mathematica, R**, *Data analysis, statistics, image analysis, optimization (LP, MIP), ...*

Languages **French (primary), English (fluent), Spanish (intermediate)**.

Teaching Experience

2015-2018 **UPMC**, *Teaching assistant (theoretical and practical), electromagnetism and optics* .

2013 **Lycée Henri IV**, *Oral examiner in classe préparatoire.*

Conferences

October 2022 **Boston Evolutionary Genomics Supergroup Annual retreat**, *Compensatory epistasis maintains ACE2 affinity in Omicron BA.1 variant.*

April 2021 **CSHL virtual conference on Systems Immunology**, *Immune fingerprints.*

March 2020 **QBio Fellow at Harvard's NSF-Simons Center**, *Statistics of the T-cell repertoire.*

August 2018 **IPols 2018 (Physics of living systems)**, *Genesis of the $\alpha - \beta$ T-cell receptor.*

June 2016 **ICFT 2016 (UK Meeting on Integrable and Conformal Field Theory)**, *Relation between fully packed loop models and $\mathcal{W}_3$.*

2015-2018 **Organizer of the PhD seminars at the LPTHE**.

Publications

2024 Abbate, Maria Francesca et al. (2024). "Computational Detection of Antigen-Specific B Cell Receptors Following Immunization". In: *Proceedings of the National Academy of Sciences* 121.35, e2401058121.

Spisak, Natanael et al. (2024). "Combining Mutation and Recombination Statistics to Infer Clonal Families in Antibody Repertoires". In: *eLife* 13, e86181.

2023 Moulana, A et al. (2023). "Genotype-Phenotype Landscapes for Immune-Pathogen Coevolution". In: *Trends in immunology* 44.5.

Moulana, Alief, Thomas Dupic, Angela M Phillips, et al. (2023). "The Landscape of Antibody Binding Affinity in SARS-CoV-2 Omicron BA.1 Evolution". In: *eLife* 12, e83442.

Phillips, Angela M, Daniel P Maurer, et al. (2023). "Hierarchical Sequence-Affinity Landscapes Shape the Evolution of Breadth in an Anti-Influenza Receptor Binding Site Antibody". In: *eLife* 12, e83628.

2022 Moulana, Alief, Thomas Dupic, Angela M. Phillips, et al. (2022). "Compensatory Epistasis Maintains ACE2 Affinity in SARS-CoV-2 Omicron BA.1". In: *Nature Communications* 13.1, p. 7011.

2021 Dupic, Thomas, Meriem Bensouda Koraichi, et al. (2021). "Immune Fingerprinting through Repertoire Similarity". In: *PLOS Genetics* 17.1, e1009301.

Phillips, Angela M, Katherine R Lawrence, et al. (2021). "Binding Affinity Landscapes Constrain the Evolution of Broadly Neutralizing Anti-Influenza Antibodies". In: *eLife* 10, e71393.

2020 Sethna, Zachary et al. (2020). "Population Variability in the Generation and Selection of T-cell Repertoires". In: *PLOS Computational Biology* 16.12, e1008394.

2019 Dupic, T., B. Estienne, and Y. Ikhlef (2019a). "The Imaginary Toda Field Theory". In: *Journal of Physics A: Mathematical and Theoretical* 52.10, p. 105201.

Dupic, T., B. Estienne, and Y. Ikhlef (2019b). "Three-Point Functions in the Fully Packed Loop Model on the Honeycomb Lattice". In: *Journal of Physics A: Mathematical and Theoretical* 52.20, p. 205003.

Dupic, Thomas, Quentin Marcou, et al. (2019). "Genesis of the $\alpha\beta$ T-cell Receptor". In: *PLOS Computational Biology* 15.3, e1006874.

2018 Dupic, Thomas, Benoit Estienne, and Yacine Ikhlef (2018). "Entanglement Entropies of Minimal Models from Null-Vectors". In: *SciPost Physics* 4.6, p. 031.

2016 Dupic, Thomas, Benoît Estienne, and Yacine Ikhlef (2016). "The Fully Packed Loop Model as a Non-Rational W3 Conformal Field Theory". In: *Journal of Physics A: Mathematical and Theoretical* 49.

2014 Castillo, Isaac Pérez and Thomas Dupic (2014). "Reunion Probabilities of N One-Dimensional Random Walkers with Mixed Boundary Conditions". In: *Journal of Statistical Physics* 156.3, pp. 606–616.