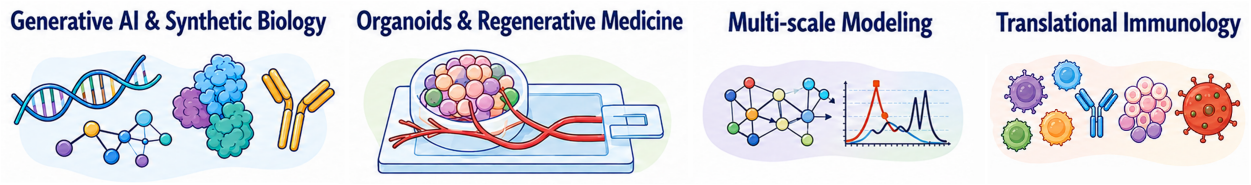
Aurelien Pelissier, Ph.D.

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ML Scientist and **Research Leader** with a track record of delivering closed-loop AI discovery at **Google X**, **Yale**, and **IBM Research**. Expert in bridging **multimodal Bio-foundation models** with **mechanistic and causal modeling** to yield biologically grounded, explainable predictions that drive **validated experimental advances** in antibody engineering, immunology, and strain design. Extensive publication record across top-tier AI venues and biology journals (**ICLR**, **Cell Stem Cell**, **Nature Portfolio**).



Experience:
- ML Scientist, **Google X Lab (A-Life)** (2026–Present) | Perturbation & Synthetic Biology
- Postdoctoral Scientist, **Yale University** (Swiss-funded) (2023–2026) | GenAI & BioFoundation Models
- ML Scientist, **IBM Research Zurich** (2019–2023) | AI for Scientific Discovery & Healthcare

Education:
- PhD, AI & Quantitative Biology, **ETH Zurich** (2019–2023) [Thesis]
- BSc & MSc, Quantum Physics, **ENS Paris-Saclay** (2018)

Selected Impact:
- Built **foundation models** for a virtual cell platform at **Google X**, leading to the identification of a novel **gene edit** that achieved **28% higher pharmaceutical yield** in bacterial fermentation.
- Developed a **real-time control loop (PID)** at Google X using inline **Raman spectroscopy** to stabilize bioreactor operation, leveraging expertise in hyperspectral denoising published in **Analytical Chemistry**.
- Engineered antibody mutations achieving **100x affinity improvement** over parent, securing a top-tier ranking in the **AIntibody Challenge** (published in **Nature Biotechnology**).
- Drove computational discovery in **therapeutic target identification**, **organoid biology** and **multiscale modeling**, resulting in high-impact publications in **Nature**, **Nature Communications**, **Cell Stem Cell**.

Selected Publications

✉ *Indicates co-project lead / co-corresponding authors*
* *Indicates co-first authors; author order may be adjusted for CV.*
Full publication list on Google Scholar

Generative AI & Algorithmic Foundations

Multimodal Foundation Models | Uncertainty Quantification | Bayesian Optimization

1 **Contextualizing biological language models across modalities via logit-space contrastive alignment** — Shao, Y., Chen, Y., Patel, Y., **Pelissier, A.**✉, & Martinez, M. R.✉. (2026). ***(Under review, ICLR)***
→ *Cross-modal contrastive alignment directly in output logit space, preserving the foundation model's grammar.*

2 **Feature selection as monte-carlo search in growing single rooted directed acyclic graph by best leaf identification** — **Pelissier, A.**, Nakamura, A., & Tabata, K. (2019). *Proceedings of the 2019 SIAM International Conference on Data Mining.* ***(SIAM)***
→ *Provable sample-efficiency bounds for MCTS over directed acyclic graphs.*

Foundation Models for Synthetic Biology | Virtual Cell

BioLanguage Models | Protein Design | Structural Bioinformatics | Perturbations | Graph Neural Networks

3 **AIntibody: a blinded, prospective benchmark of in-silico antibody discovery anchored to experimental affinity and developability** — Erasmus, M. F., Bedinger, D., ..., **Pelissier, A.**, ..., Ferrara, F., & Bradbury, A. R. M. (2026). ***(Nature Biotechnology)***
→ *Led the Yale team to **3rd place** of the second challenge and **6th place** of the first challenge, among 33 participants.*

4 **AbRank: a benchmark dataset and metric-learning framework for antibody-antigen affinity ranking** — **Pelissier, A.***, Lui, C.*, Denzle, L., Shao, Y., Martin C.R., A., Paige, B., & Martinez, M. R. (2026). ***(Under review)***

5 **IMMREP25 Challenge: predicting TCR specificity for new antigens** — Richardson, E., Jurriaan, Y., ..., **Pelissier, A.**, ..., May, H. D., & Peters, B. (2026). ***(Under review, Nature Methods)***
→ *Led the Yale team to **1st place** for sequence-only TCR-peptide model; generalizes to new antigens.*

6 **Do domain-specific protein language models outperform general models on immunology-related tasks?** — **Pelissier, A.***, Deutschmann, N.*, Weber, A., Gao, S., Bogojeska, J., & Martinez, M. R. (2024). ***(ImmunoInformatics)***

Systems Biology & Organoid Modeling | Regenerative Medicine

ScRNA-seq | Spatial | Gene Regulatory Networks | Cell-Cell Signaling | Human Atlas Benchmarking

7 **An immune-coupled human heart-on-chip for dissecting and treating myocardial ischemia-reperfusion injury** — Quintard, C., Wang, J., **Pelissier, A.**, Ramisch, S., ..., ., & Penninger, M. J. (2026). ***(Under review, Nature Biotechnology)***

8 **Modeling human hematopoiesis in bone marrow organoids** — Quintard, C., Salewskij, K., Ramisch, S., Tenorio, E., Ren, J., Ania, B., … **Pelissier, A.**✉ & Penninger, M. J.✉. (2026). ***(In revision, Cell Stem Cell)***

9 **Organotypic vascularization improves human islet organoids survival and reverses diabetes** — **Pelissier, A.***, Wang, J.*, SH. Lin, J., Quintard, C., Tamakhina, A., Wang, J., … Penninger, M. J. (2026). ***(Cell Stem Cell)***

10 **BACH1 as a key driver in rheumatoid arthritis fibroblast-like synoviocytes identified through gene network analysis** — **Pelissier, A.***, Laragione, T.*, Harris, C., Martínez, M. R., & Gulko, P. S. (2024). ***(Life Science Alliance)***
→ *Identified computationally BACH1 inhibition as a promising therapeutic strategy for RA, validated in vitro and currently undergoing in vivo testing*

11 **Cell-specific gene networks and drivers in rheumatoid arthritis synovial tissues** — **Pelissier, A.**, Laragione, T., Gulko, P. S., & Martinez, M. R. (2024). ***(Frontiers in Immunology)***
→ *Contributed talk at ISMB2022 (Leading conference in computational biology, ranked A/A*).*

Scalable Stochastic Modeling & Multi-Scale Dynamics | Evolutionary Inference

Non-Markovian Processes | Agent Heterogeneity | Evolutionary Dynamics | Spatiotemporal Modeling

12 **Unifying non-Markovian dynamics and agent heterogeneity in scalable stochastic simulation** — **Pelissier, A.**, Phan, M., LeBail, D., Beerenwinkel, N., & Rodriguez Martinez, M. (2026). ***(Nature Communications)***
→ *Contributed talk at ISMB2021 (Leading conference in computational biology, ranked A/A*).*

13 **Gillespie-based simulation and inference for non-Markovian stochastic reaction networks** — **Pelissier, A.**, Phan, M., Beerenwinkel, N., & Martinez, M. R. (2026). ***(Briefings in Bioinformatics)***

14 **Computational model reveals a stochastic mechanism behind germinal center clonal bursts** — **Pelissier, A.**, Akrout, Y., Jahn, K., Kuipers, J., Klein, U., Beerenwinkel, N., & Martinez, M. R. (2020). ***(MDPI Cells)***
→ *Outstanding Presentation & Third best poster award at ISMB2020.* [Certificate]

15 **Convergent evolution and B-cell recirculation in germinal centers in a human lymph node** — **Pelissier, A.***, Stratigopoulou, M.*, Dimitriadis, E., ..., Martinez, M. R., & EJ Guikema, J. (2023). ***(Life Science Alliance)***

Biophotonics & Computational Imaging

Raman Spectroscopy | Hyperspectral Unmixing | Signal Denoising

16 **Beyond the nucleus: cytoplasmic dominance in follicular thyroid carcinoma detection using single-cell Raman imaging across multiple devices** — **Pelissier, A.***, Hashimoto, K.*, Mochizuki, K.*, Taylor, J. N., Clément, J.-E., Kumamoto, Y., … Komatsuzaki, T. (2025). ***(Analytical Chemistry)***

17 **Correction for extrinsic background in Raman hyperspectral images** — Taylor, J. N., **Pelissier, A.**, Mochizuki, K., Hashimoto, K., Kumamoto, Y., Harada, Y., … Komatsuzaki, T. (2023). ***(Analytical Chemistry)***

Translational Immunology & Clinical Bioinformatics

Clinical Genomics | *Clonal Evolution* | *Circadian Transcriptomics* | *Adaptive Immune Repertoires*

18 **Diurnal control of heat generation and bone formation by tissue-infiltrating neutrophils** — Vicanolo, T., Kameda, K., ..., **Pelissier, A.**, ..., Ballesteros, I., & Hidalgo, A. (2026). ***(In revision, Science)***

19 **Spatial organisation of tumor-infiltrating B cells in Claudin 18.2-expressing gastric cancer** — Zhao, J., Lee, C., ..., **Pelissier, A.**, ..., Rha, S. Y., & Sundar, R. (2026). ***(Clinical Cancer Research)***

20 **Clonal evolution of myeloid malignancies treated with microtransplantation: A single-centre experience** — Sammut, R., Fenwarth, L., **Pelissier, A.**, Marceau, A., Duployez, N., Benachour, S., … Loschi, M. (2025). ***(Journal of Cellular and Molecular Medicine)***

21 **Exploring the impact of clonal definition on B-cell diversity: implications for the analysis of immune repertoires** — **Pelissier, A.***, Luo, S.*, ..., EJ Guikema, J., & Martinez, M. R. (2023). ***(Frontiers in Immunology)***

Invited Talks & Presentations

- **Keynote Speaker** — Representing IBM Research at the Biotechnet Meet-Up 2023.
  Presented: *AI-Driven Engineering of the Immune System*.
- **Invited Talk** — AstraZeneca Journal Club (2025).
  Presented: *Abrank: A metric-learning framework for antibody-antigen affinity ranking*.
- **Highlight Talk**, **ECCB** 2026, *Unifying non-Markovian dynamics and agent heterogeneity in stochastic networks*
- Contributed talk, **ISMB** 2022, *Cell-type Specific Gene Regulation in Rheumatoid Arthritis*.
- Contributed talk, **ISMB** 2021, *A Rejection Gillespie Algorithm for Non-Markovian Stochastic Processes*.
- **Outstanding Presentation & Best Poster Award** (Third Place), ISMB 2020, *Computational Model Reveals a Stochastic Mechanism Behind Germinal Center Clonal Bursts* [Poster][Certificate].
- Contributed poster, **ISMB** 2022, *Characterization of Antibody Specificity Leads to the Identification of Convergent Evolution in Germinal Centers* [Poster].
- **Invited Pitch** — Swiss Blockchain Federation (SBF) member event 2022.
  Presented: *Peer2Panel: Investing into a bright future* [Talk].

Awards & Certifications

2026 **Recipient of U.S. O-1A Extraordinary Ability Classification**
Mountain View, CA, USA
Granted for demonstrated excellence and sustained international acclaim in Computational Biology.

2025 **Third Place, Challenge 2 — AIntibody Competition**
New Haven, CT, USA
Awarded for an experimentally validated antibody design with high affinity and developability [3].

2023 **Nomination for the ETH Silver Medal**
ETH Zurich, Switzerland
Awarded to outstanding doctoral theses.

2021 **Grant award from the Innosuisse entrepreneurship program**
ETH Zurich AI Center's TalentKick, Switzerland
• Peer2Panel makes investment in renewable energy secure, transparent, and accessible through Ethereum-based tokens (NFTs) backed by physical solar panels.
→ *Funded with the Innosuisse Innovation Booster Blockchain grant (CHF 20k)*
→ *Launched an on-chain marketplace pilot with Clinica Somer in Colombia*

Awards & Certifications (continued)

2020 **Best Poster Award (3rd place) at ISMB2020**
Montreal, Canada
Awarded for an outstanding presentation in *Computational Modeling of Biological Systems* [Certificate].

2014 **Appointed Normalien (civil-servant trainee) at École Normale Supérieure.**
Paris-Saclay, France
Highly selective status conferred by the French Ministry of Education following a national competitive examination [Official Decree].

Leadership & Technical Expertise

Leadership — Co-Senior / Co-Corresponding Author on Multi-Institutional Papers, Technical Coordination of Cell Foundation Model Development at Google X, Defined Research Roadmap for Bio-Chemical Foundation models at Yale, Technical Mentorship of PhD and Postdoctoral Scientists, Budgeting / Financial Coordination for the AIntibody Challenge, Open Source: Maintainer of AI-SysBio and AI-MathPhys (AI for Science), Entrepreneurship: Secured Innosuisse Innovation Booster Blockchain Grant, Grant Writing & Strategy: Contributed to Successful Swiss National Funding. Hiring & Selection of Postdoctoral Scientists.

ML & Coding — Python, R, C++, MATLAB, Fortran, Solidity
Git, Linux/Bash, Docker, gcloud CLI, AWS, Vertex AI,
PyTorch, TensorFlow, JAX, Hugging Face, Weights & Biases
Generative AI, Bio-Foundation Models, Masked Language Models,
Multimodal Learning, Contrastive Learning, LLM Fine-Tuning,
Graph Neural Networks, Geometric Deep Learning,
Stochastic Processes, Bayesian Statistics, Reinforcement Learning,
Quantum Machine Learning for CompBio, Qiskit.

CompBio — Digital Twins & Virtual Cell Platforms, Microbial Foundation Models, Perturbation Modeling, Gene Editing Prediction, Fermentation Optimization, AlphaFold 3, Protein–Ligand Interactions, T-cell and Antibody Engineering, ScRNA-seq, RNA Velocity, Spatial Transcriptomics, ScATAC-seq, Proteomics, Multi-Omics & Clinical Data Integration, GWAS, Human and Mouse Atlases, Gene Regulatory Networks, Cell-Cell Communication Networks, Immune Repertoires, Somatic Evolution, Phylogenetic Inference, Non-Markovian Processes, Mechanistic Models, Multi-Scale Dynamics, Biophotonics, Raman Spectroscopy, Metabolomics, Fluxomics.

Work Experience

Appointments

2026 – Present **ML Scientist - Perturbation Modeling & Synthetic Biology**
A-Life, Google [X] The Moonshot Factory, United States

Mission: Enable at-scale biomanufacturing of mass-market biologics and chemicals (incl. pharmaceuticals and proteins) in bioreactors with engineered microorganisms (e.g., bacteria and yeast), reducing costs vs. traditional manufacturing.

Role 1: Integrate multi-modal cell foundation models with mechanistic and causal modeling to recommend genetic edits/perturbations and optimize growth conditions, accelerating design–build–test–learn (DBTL) in synthetic biology.

Role 2: Develop a real-time control loop (PID) using inline Raman spectroscopy feedback (via calibrated spectral models) to track product/byproduct/impurity concentrations and stabilize bioreactor operation.

2023 – 2026 **Postdoctoral Scientist - GenAI, Bio-Foundation Models & Regenerative Medicine**
Yale School of Medicine, United States
• Developed generative AI and foundation model approaches for synthetic biology, spanning bio-language models, protein design and structural bioinformatics [1, 3, 4, 5, 6]
→ *Led Yale team submissions to the AIntibody challenge [3] and the IMMREP25 TCR specificity benchmark [5], achieving 1st place in the sequence-only TCR-peptide track and top rankings in antibody design.*

Life Sciences Institute, University of British Columbia, Canada
• Led computational biology analyses for vascularized organoid-on-chip systems, including scRNA-seq, cell–cell signaling inference, and gene regulatory network analysis.
→ *Identified key transcription factors and signaling pathways driving organogenesis, directly shaping findings of studies in Nature and Cell Stem Cell, with predictions validated experimentally [7, 8, 9].*

2019 – 2023 **Ph.D. Fellowship - AI & Quantitative Biology | Immunology**
IBM Research Zurich & ETH Zurich, Switzerland
AI for Scientific Discovery — Prof. Maria Rodriguez Martinez.
Stochastic Modeling of the Humoral Immune Response: A Multi-scale Challenge [Thesis].
• Conducted research at the intersection of stochastic modeling, machine learning, and high-dimensional transcriptomic to study immune system dynamics across scales.
→ *Resulted in 7 first-author publications [10, 11, 12, 13, 14, 15, 21].*
→ *Nominated for the 2023 ETH Silver Medal awarded to outstanding doctoral theses.*

2018 – 2019 **Research Scientist - AI, Reinforcement Learning | Raman Spectroscopy**
Imperial University of Hokkaido, Japan
Molecule & Life Nonlinear Science Laboratory — Prof. Tamiki Komatsuzaki
• Conducted research in reinforcement learning and Raman image denoising for cancer diagnosis, with a focus on feature selection, robustness, and clinical translation.
→ *Published at SIAM SDM conference [2] and in Analytical Chemistry [16, 17].*

2014–2018 **Normalien - Quantum Systems Modeling**
ENS Paris-Saclay, France
• Admitted through France's highly selective national competitive examination and completed a four-year research training program in physics and chemistry, preparing for careers in academia and research [Official Decree].
→ *Research placements at UBC (Canada), EPFL (Switzerland), and LPQM (Paris-Saclay), focused on quantum modeling, ultrafast spectroscopy, and molecular photonics.*
→ *Served as Physics-Chemistry oral examiner (khôlleur) at Lycée Raspail, Paris, preparing CPGE students for competitive oral examinations.*

Education

2019 – 2023 **Ph.D. Fellowship - AI & Quantitative Biology** [Thesis]
ETH Zurich, Switzerland – Joint program with IBM Research.
Germinal center B cell evolution, Antigen-Antibody binding, Gene regulatory networks, Single cell transcriptomic, non-Markovian processes, Interpretable AI, Drug discovery.
→ *Nominated for the 2023 ETH Silver Medal awarded to outstanding doctoral theses.*

2017 – 2018 **M.Sc. Quantum physics, Nanophysics**
University Grenoble - Alpes, France
Double degree with ENS Paris-Saclay.
Quantum information theory, Nanoelectronics, Nanomagnetism, Nanophotonics.

2014 – 2018 **Grande École Degree - Fundamental physics & Applications**
Ecole Normale Superieure (ENS), Paris-Saclay, France
PHYTEM (PHYsics, Theory, Experiment, Modeling).
Statistical physics, Solid state physics, Astrophysics, Particle physics, Semiconductors.

2012 – 2014 **Scientific CPGE**
Classe Préparatoire aux Grandes Écoles (CPGE), Grenoble, France
Two years preparation to highly selective national competitive exam.