

ETIENNE P. CHOLLET

Research Interests: representation learning, generative models, learning with weak and synthetic supervision, interactive segmentation, and understanding inductive biases in deep vision systems.

etiennepchollet@gmail.com —  EtienneChollet

EDUCATION

Fairfield University

Bachelor of science in Biochemistry, Minor in Mathematics

Fairfield, CT

September 2017 – December 2021

Yale University School of Medicine

Visiting Student, Department of Surgery

New Haven, CT

Feb 2021 – Feb 2022

RESEARCH EXPERIENCE

Research/Machine Learning Engineer II

July 2022 – Present

MASSACHUSETTS GENERAL HOSPITAL / MIT CSAIL

Boston, MA

- Studied how 3D convolutional networks learn vascular structure under fully synthetic supervision, using domain randomization to expose which visual features are necessary for generalization.
- Developed conditional diffusion models to disentangle anatomical structure from acquisition-specific noise, using generation as a tool to analyze learned representations rather than as a data augmentation mechanism.
- Developed interactive segmentation models that treat sparse user input as a conditioning signal, enabling controlled generation of segmentations and analysis of how models integrate human guidance.
- Mentored two students (one computer science undergraduate UROP student and one highschool student) in research projects, guiding them through model development and experimental design.

Undergraduate Researcher

Jan 2021 – July 2022

YALE UNIVERSITY SCHOOL OF MEDICINE | Department of Surgery

New Haven, CT

- Designed machine learning pipelines in TensorFlow for semantic segmentation of arteries and staging of vascular disease severity from lower-extremity angiograms.
- Observed vascular surgeries of the lower extremities to gain practical insights and facilitating an understanding of clinical applications.
- Used UNet architecture for segmentation of arteries and GoogLeNet for classification of vasculopathy.
- Collaborated within a multidisciplinary team, including a vascular surgeon, surgery residents, and medical students, to bridge machine learning/computer vision research with real-world medical expertise.

Undergraduate Researcher (Physical/Computational Chemistry)

Jan 2019 – Dec 2021

FAIRFIELD UNIVERSITY | Department of Chemistry/Biochemistry

Fairfield, CT

- Investigated time-dependent photophysics in peptide systems by inferring latent electronic states from delayed, indirect spectroscopic measurements.
- Used controlled perturbations (chromophore swaps, UV-IR timing) to causally probe how structural priors constrain observable fragmentation pathways.
- Developed intuition for inverse problems where small changes in latent structure produce qualitatively different observable outcomes.
- Synthesized oligomers using wet peptide synthesis to determine enantiopurities using xray crystallography. Compared to computational simulations.
- Used ^1H -NMR, ^{13}C -NMR, COSY, NOESY, HPLC, and MALDI-ToF mass spectrometry for analyses of and quality assurance of syntheses.
- Ran molecular dynamics simulations (GROMACS) to model temperature-dependent conformational transitions in chirally-capped Aib oligomers, comparing simulated populations to experimental NMR and crystallographic data.

RESEARCH ARTICLES

Neural Information Processing Systems (NeurIPS)

December 2025

- Marianne Rakic, Siyu Gai, **Etienne Chollet** John Gutttag, and Adrian Dalca. “Pancakes: Consistent Multi-Protocol Image Segmentation Across Biomedical Domains.”
<https://neurips.cc/virtual/2025/loc/san-diego/poster/119522>

Alzheimer’s & Dementia Journal

November 2025

- Mackenzie Hyman, Shuaibin Chang, Dayang Gong, **Etienne Chollet**, Jiarui Yang, Anna Novoseltseva, Ayman A. Abdelhakeem, Glce Kreli, Shuying Li, Josh Bevan, Janice Weinberg, Patrick R. Hof, Ann C. McKee, Irving J. Bigio, David A. Boas, Bertrand R. Huber, and Hui Wang. “Mesoscopic vascular alterations in Alzheimer’s disease” <https://alz-journals.onlinelibrary.wiley.com/doi/10.1002/alz.70907>

International Society for Magnetic Resonance in Medicine (ISMRM)

May 2025

- Chiara Mauri, **Etienne Chollet**, Adam Willis, Aliyah Jama, Alisha Mahmood, Angelina Ream, Itzel Garcia, Malak Benlahcen, Sariya Wood, Stephanie Lin, Priyanka Onta, Nam Tran, Xiangrui Zeng, Caroline Magnain, Rogeny Herisse, Erendira Xenia Garcia Pallares, Malte Hoffmann, Bruce Fischl, and Yaël Balbastre. “A method for automatic 3D vasculature segmentation in ex vivo MRI using synthetic data” <https://archive.ismrm.org/2025/1054PW16z7QCr.html>

Preprint

Submitted: July 2024

- **Etienne Chollet**, Yaël Balbastre, Chiara Mauri, Caroline Magnain, Bruce Fischl, and Hui Wang. “Neurovascular Segmentation in sOCT with Deep Learning and Synthetic Training Data.” arXiv:2407.01419

Journal of the American Chemical Society

April 2024

- Casey D. Foley, Chin Lee, Ali Abou Taka, Kendrew Au, **Etienne Chollet**, Matthew A. Kubasik, Laura M. McCaslin, and Timothy S. Zwier. “Site-Specific Photochemistry along a Protonated Peptide Scaffold.” DOI: 10.1021/jacs.4c01576

Medical Imaging with Deep Learning – Short Paper

April 2024

- **Etienne Chollet**, Yaël Balbastre, Caroline Magnain, Bruce Fischl, and Hui Wang. “A Label-Free and Data-Free Training Strategy for Vasculature Segmentation in Serial Sectioning OCT Data.” arXiv:2405.13757v1

RESEARCH ABSTRACTS AND PRESENTATIONS

Presentation | *MEDICAL IMAGING WITH DEEP LEARNING.*

Paris, July 2024

- **Etienne Chollet**, Yael Balbastre, Caroline Magnain, Bruce Fischl, and Hui Wang. “A Label-Free and Data-Free Training Strategy for Vasculature Segmentation in Serial Sectioning OCT Data.”

Abstract | *JOURNAL OF VASCULAR SURGERY.*

April 2023

- **Etienne Chollet**, Keyuree Satam, Ocean Setia, Edouard Aboian. “Development of a Machine Learning Algorithm to Automate Occlusion Detection in Lower Extremity Conventional Angiograms.” DOI: 10.1016/j.jvs.2023.01.092

Presentation | *INTERNATIONAL SYMPOSIUM ON MOLECULAR SPECTROSCOPY.*

June 2022

- Casey Foley, **Etienne Chollet**, Matthew Kubasik, Timothy Zwier. UV Photofragment Spectroscopy and Electronic Energy Transfer on a Peptide Scaffold: The Case of Near-Degenerate UV Chromophores.

Presentation | *YALE UNIVERSITY Department of Surgery - 5th Annual Research Day*

April 2022

- **Etienne Chollet**, Keyuree Satam, Ocean Setia, Edouard Aboian. Development of Novel Efficient Algorithm to Automate Occlusion Detection in Lower Extremity Conventional Angiograms.

Presentation | *FAIRFIELD UNIVERSITY - Sigma Xi Research Symposium*

April 22, 2021

- Korst, Mark R., **Chollet, Etienne P.G.** Quantifying Beta Turn Equilibrium in Oligomers of aaminoisobutyric Acid Using Experimental and Computational Techniques.

Accepted Presentation | *AMERICAN CHEMICAL SOCIETY*

March 2020*

- Korst, Mark R., **Chollet, Etienne P.G.**, Alveranga, Karim O., Martin, Rachel A., Elvir, Brayan., Kubasik, Matthew A. Synthesis and spectroscopic confirmation of Aib peptides containing chiral C-terminus groups.

Accepted Presentation | *AMERICAN CHEMICAL SOCIETY*

March 2020*

- **Chollet, Etienne P.G.**, Korst, Mark R., Alveranga, Karim O., Martin, Rachel A., Elvir, Brayan., Kubasik, Matthew A. ¹H-NMR and X-ray characterization of diastereotopic excess of chirally-biased Aib oligomeric peptides.

PROJECTS / SOFTWARE

ontomics | *Rust*

Mar 2025 – Present

- Extract domain ontologies from codebases to reduce LLM token consumption by 20x and time by 10x. 1,600 downloads in the first week of release through organic discovery. Supports Claude Code, Codex, Pi, and OpenClaw.
- Available on:NPMJS

VoxelMorph | *Python*

Jan 2025 – Present

- Core maintainer of a widely used learning-based image registration framework; contributed to model abstractions, training pipelines, and reproducibility infrastructure.
- Available on:GitHub, PyPi

Neurite | *Python*

Jan 2025 – Present

- Core maintainer of machine learning toolbox.
- Available on:GitHub, PyPi

SynthShapes | *Python*

July 2024 – Jan 2025

- Designed a synthetic data generator to study how geometric priors and noise models influence learned representations in 3D convolutional networks.
- Available on:GitHub, PyPi

oct_vesselseg | *Python*

May 2023 – Jan 2025

- A Label-free and data-free synthesis engine and training framework for vascular segmentation of OCT data with PyTorch. Supporting active NIH-funded research projects.
- Available on:GitHub, PyPi

TEACHING/MENTOR EXPERIENCE

Mentor

Jan 2024 – Present

MASSACHUSETTS GENERAL HOSPITAL | *Laboratory for Computational Neuroimaging* Boston, MA

- Introduced one highschool and one college student to the fundamental practices of machine learning, covering real-world architectures, data handling, and model optimization.
- Guided mentees through their first machine learning applications in neuroimaging, using our teams projects as teaching modules.

Teacher's Assistant

Sept 2021 – Dec 2021

FAIRFIELD UNIVERSITY | *Quantum/Physical Chemistry Laboratory* Fairfield, CT

- Ran preliminary experiments, refined methods, and analyzed data prior to laboratory meetings.
- Prepared chemical species for use by students prior to laboratory meetings.
- Assisted students with acquisition, treatment, and interpretation of experimental data inside and outside of the laboratory.

Teacher's Assistant, Tutor, & Mentor

Aug 2019

FAIRFIELD UNIVERSITY | *Academic Immersion Summer Program*

Fairfield, CT

- Led study halls daily after class, helping newly matriculated, underrepresented, first year students understand the fundamental concepts of biochemistry.
- Lived alongside students, providing emotional support, advice, and mentorship as they adjust to college.

EXAMINATIONS

- Medical College Admissions Test (MCAT): Scored in the 100th percentile on the chemistry/physics/mathematics section of the MCAT.
- American Chemical Society: Scored in the 96th percentile on nationally administered examination covering Organic Chemistry I & II

HONORS, AWARDS, GRANTS

- Organic Chemistry Outstanding Achievement Award | 2018/2019
- Dean's List | All semesters 2019 - 2021
- Mancini Family Faculty Student Research Fund Recipient | 2019

TECHNICAL SKILLS

Core Areas: deep learning, representation learning, generative models, weak supervision, interactive segmentation.

Languages: Python, TypeScript, Swift, PHP, HTML, LaTeX.

Libraries: TensorFlow, PyTorch, FastAPI, Keras, OpenCV, NumPy, Pandas, scikit-learn.

Techniques: Machine learning, computer vision, supervised segmentation, diffusion denoising [models], clustering, image classification.

Applications: FreeSurfer, ImageJ, Apeer, Napari, Visual Molecular Dynamics (VMD), MATLAB, GROMACS.

Spectroscopy/Analytical Chemistry: ¹H-NMR, ¹³C-NMR, COSY, NOESY, HPLC, MALDI-ToF, gas chromatography, IR & UV.