

CAO TRẦN BÍCH NGỌC

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EDUCATION

International Max Planck Research School for Genome Science 2022–present
- Georg-August University School of Science
Ph.D. in Genome Science

École Normale Supérieure Paris – Department of Biology 2019–2021
Master 1 International Master in Life Sciences (IMaLiS) 2019–2020
Master 2 (IMaLiS) System Biology, Genomics & Bioinformatics 2020–2021

University of Science and Technology of Hanoi (USTH), Vietnam 2016–2019
Bachelor of Pharmacological, Medical and Agronomical Biotechnology (PMAB)
GPA: 17.11 / 20 (Very Good – 1st in class)

RESEARCH EXPERIENCE

Max Planck Institute for Multidisciplinary Sciences (MPI-NAT) – Lise Meitner Research Group
Genome Organization and Regulation, Göttingen, Germany
Supervisor: [Dr. Marieke Oudelaar](#) (Jan 2022–present)
Ph.D thesis: “*Regulation of enhancer-promoter interactions during cellular differentiation*”

European Molecular Biology Laboratory (EMBL) – Genome Biology unit, Heidelberg, Germany
Supervisor: [Dr. Eileen Furlong](#) (June 2021 – December 2021)
Research Associate, project: “*Optogenetic Control of Condensin in Drosophila Embryos using iLEXY*”

Institut Curie – INSERM U932, Immunity and Cancer, Equipe Innate Immunity, Paris, France
Supervisor: [Dr. Nicolas Manel](#) (Jan 2021 – June 2021)
M2 thesis: “*Analysis by ATAC-seq and ChIP-seq of a new virus detection mechanism*”

Institut Pasteur – CNRS-UMR3525, Unite Spatial Regulation of Genomes, Paris, France
Supervisor: [Dr. Romain Koszul](#) (Feb 2020 – July 2020)
M1 thesis: “*Spatial Regulation of HBV integration in hepatocarcinoma cancer*”

Centre de Recherche en Cancérologie de Toulouse (CRCT) – Epigenomics and network modelling of heterogeneity in immuno-oncology, Toulouse, France
Supervisor: [Dr. Vera Pancaldi](#) (April – July 2019)
Bachelor thesis: “*Study chromatin changes in differentiation of monocytes into macrophages to understand macrophage polarization in the tumor microenvironment*”

LMI-RICE (International Joint Laboratory) – Agriculture genetics institute, Hanoi, Vietnam
Supervisor: [Dr. To Thi Mai Huong](#) (Sep 2018 – December 2018)
Internship: “*Root development in response to stress: analysis of Jasmonate signaling in rice*”

National Yang-Ming University – Institute of Biomedical Informatics, Taipei, Taiwan
Supervisor: Dr. Yen-Hua Huang (July – August 2018)
Internship: “*Correlation between immune infiltration & survival of liver hepatocellular cancer by RNA-seq data*”

PUBLICATIONS

- **Cao T. B. N.**, Tsouraki D., Sagropoulou S., Mauksch C., Eray A., Janssen J., Siegmund L., Ramasamy S., Žumer K. & Oudelaar A. M. Rapid optogenetic perturbation of a master transcription regulator identifies hierarchy in gene regulatory events. In preparation.
- Cavalheiro, G. R., Girardot, C., Viales, R. R., Pollex, T., **Cao, T. B. N.**, Lacour, P., Feng, S., Rabinowitz, A. & Furlong, E. E. M. (2023). CTCF, BEAF-32, and CP190 are not required for the establishment of TADs in early *Drosophila* embryos but have locus-specific roles. *Science Advances*, 9(5), eade1085. <https://doi.org/10.1126/sciadv.ade1085>
- Karpinska, M. A., Zhu, Y., Ghazvini, Z. F., Ramasamy, S., Barbieri, M., **Cao, T. B. N.**, Varahram, N., Aljahani, A., Lidschreiber, M., Papantonis, A. & Oudelaar, A. M. (2025). CTCF depletion decouples enhancer-mediated gene activation from chromatin hub formation. *Nature Structural & Molecular Biology*, 32(7), 1268–1281. <https://doi.org/10.1038/s41594-025-01555-z>
- Lahaye, X., Van, P. T., Chakraborty, C., Shmakova, A., **Cao, N. T. B.**, Ferran, H., Ait-Mohamed, O., Maurin, M., Waterfall, J. J., Kaufer, B. B., Fischer, P., Hennig, T., Dölken, L., Lomonte, P., Fachinetti, D. & Manel, N. (2025). Centromeric DNA amplification triggered by viral proteins activates nuclear cGAS. *Cell*, 188(15), 4043–4057.e21. <https://doi.org/10.1016/j.cell.2025.05.008>
- Madrid-Mencía, M., Raineri, E., **Cao, T. B. N.** & Pancaldi, V. (2020). Using GARDEN-NET and ChAseR to explore human haematopoietic 3D chromatin interaction networks. *Nucleic Acids Research*, 48(8), 4066–4080. <https://doi.org/10.1093/nar/gkaa159>
- Ramasamy, S., Aljahani, A., Karpinska, M. A., **Cao, T. B. N.**, Velychko, T., Cruz, J. N., Lidschreiber, M. & Oudelaar, A. M. (2023). The Mediator complex regulates enhancer-promoter interactions. *Nature Structural & Molecular Biology*, 30(7), 991–1000. <https://doi.org/10.1038/s41594-023-01027-2>

POSTER & PRESENTATIONS

- **Talk** – TriRhena Gene Regulation Club 2025 – “*Optogenetic Dissection of GATA1 Function in Chromatin and Transcription During Erythroid Differentiation*”
- **Poster** – Gordon Research Conference (GRC) 2025, Genome Architecture in Cell Fate and Disease – “*Dynamics of transcription factor binding & chromatin conformation during erythroid differentiation*”
- **Poster** – Cold Spring Harbour Laboratory Conference, Epigenetics and Chromatin 2024 – “*CTCF depletion decouples enhancer-mediated gene activation from chromatin hub formation during cellular differentiation*”
- **Poster** – Journées ouvertes en biologie, informatique, et mathématiques (JOBIM) conference 2020: “*Pseudo mitosis during differentiation in Multiciliated cells to drive de novo centriole amplification*”

SKILLS

- Wet lab & data analysis:
 - Transcriptomic and epigenomic assays: RNA-seq, TT-seq, ATAC-seq, ChIPmentation, Cut&Tag, MCC (Hi-C variant)
 - Molecular biology techniques: CRISPR-based gene editing, cloning, Western blotting
 - Cell culture: mouse embryonic stem cell culture, cellular differentiation, Flow Cytometry
 - Microscopy: Live imaging, Immunofluorescence with Confocal Microscope
 - Setting up new system (optogenetics)
- Language, software:
 - R, Python, Bash, Snakemake, Nexflow, Git, Macro Fiji, Cluster usage (SLURM), FlowJo
 - Markdown LaTeX, Inkscape, Affinity Designer, basic Photoshop, Image Analysis with ImageJ
- Manuscript writing, fellowship grant writing, peer review

HONOR AND AWARDS

- 2025: Best Poster Award (1st place), GRC Genome Architecture in Cell Fate and Disease
- 2022-2025: Boehringer Ingelheim Fonds PhD fellowship (BIF) (with extension fellowship)
- 2019-2021: Excellence QLIFE Master scholarship
- 2019: Odon Vallet scholarship for excellent students in Vietnam
- 2016-2019: USTH Full scholarship for excellent students (bachelor)
- 2018: Student Exchange scholarship with NYMU