# Robin Bruneau

Postdoctoral Researcher in 3D Computer Vision

3D Reconstruction · Multi-View Stereo · Photometric Stereo
Inverse Rendering · Refraction

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PhD in Computer Science specialised in 3D surface reconstruction from images (multi-view stereo, photometric stereo, neural rendering). Publications at NeurIPS, CVPR and IJCV, open code and data, industrial R&D experience. **Seeking a postdoctoral or research engineer position in 3D vision from 2027: surface reconstruction, neural and inverse rendering, 3D digitisation.**

## RESEARCH EXPERIENCE

**Postdoctoral Researcher** 2024 – 2026
Universität Zürich (UZH) – Department of Quantitative Biomedicine *Zurich, Switzerland*

- Designed and led Martine (NeurIPS 2026), a multi-view 3D reconstruction benchmark: 28 objects, 84 views, single- and multi-light capture, 3D ground truth. Evaluation of photogrammetry, MVS, NeuS, Gaussian Splatting and multi-view photometric stereo; open data and code.
- Completion of PhD work: RNb-NeuS2 (IJCV 2025) and integration into Meshroom/AliceVision (ECCV-W 2026).

**PhD Candidate in Computer Science (joint degree)** 2021 – 2024
DIKU, University of Copenhagen & IRIT, University of Toulouse *Copenhagen, Denmark / Toulouse, France*

- Thesis: *3D Reconstruction with Refraction*. Modelling refraction for the 3D reconstruction of immersed objects, with photometric stereo (SSVM 2023) and multi-view stereo (JEI 2024).
- Co-developed RNb-NeuS (CVPR 2024), a neural implicit reconstruction method driven by normal and reflectance maps, then its fast CUDA version RNb-NeuS2 (IJCV 2025, first author).

## INDUSTRY EXPERIENCE

**Computer Vision R&D Engineer** 2020 – 2021
Fittingbox – virtual try-on *Toulouse, France*

- Realistic placement of 3D eyeglasses on a virtual face for virtual try-on.
- Handling facial expressions in face tracking and modelling them with a 3D avatar.

**Research Intern (2 months)** 2019
IRIT, team REVA *Toulouse, France*

- 3D reconstruction from historical photographs (Structure-from-Motion, SIFT features).

## EDUCATION

**PhD in Computer Science** 2021 – 2024
University of Copenhagen & University of Toulouse *Defended on 16 October 2024*
Supervisors: François Lauze, Jean-Denis Durou · Co-supervisors: Yvain Quéau, Kim Steenstrup Pedersen
Assessment committee: Sune Darkner (DIKU), Peter Sturm (Inria Grenoble), Tomas Pajdla (CIIRC, CTU Prague)
theses.hal.science/tel-05311063

**Engineering Degree (MSc equivalent) – Computer Science** 2017 – 2020
ENSEEIHT (Toulouse INP) *Toulouse, France*
Digital Sciences, major in Image and Multimedia

**Preparatory classes for engineering schools (PT)** 2015 – 2017
Lycée Livet *Nantes, France*

## PUBLICATIONS

**NeurIPS 2026** **Martine: Benchmarking Multi-View 3D Surface Reconstruction Across Viewpoint Coverage, Resolution, and Lighting**
R. Bruneau*, B. Brument*, F. Giraud, B. Sigrist, S. Jecklin, P. Fürnstahl, B. Menze, L. Calvet. *NeurIPS, Evaluations & Datasets Track* · arXiv:2611.11602

**ECCV-W 2026** **Integrating Multi-view Multi-light Surface Reconstruction into Cultural Heritage Workflows**
B. Brument, R. Bruneau, B. Coupry, V. Demoulin, J. Mélou, A. Laurent, F. Castan, J.-D. Durou, L. Calvet. *ECCV Workshops (VISART)* · arXiv:2609.15833

**PIONNIER 2026** **De la surface aux normales : complémentarité des méthodes photographiques pour le patrimoine**
A. Laurent, B. Brument, B. Coupry, J. Mélou, R. Bruneau, N. Rottier, L. Bayel, T. Sagory, J.-D. Durou. *Seminar PIONNIER*, Nantes · hal-05700668

**IJCV 2025** **RNb-NeuS2: Multi-View Surface Reconstruction Using Normal and Reflectance Cues**
R. Bruneau*, B. Brument*, Y. Quéau, J. Mélou, F. Lauze, J.-D. Durou, L. Calvet. *International Journal of Computer Vision* · arXiv:2506.04115

**CVPR 2024** **RNb-NeuS: Reflectance and Normal-based Multi-View 3D Reconstruction**
B. Brument*, R. Bruneau*, Y. Quéau, J. Mélou, F. Lauze, J.-D. Durou, L. Calvet. *CVPR* · arXiv:2312.01215

**JEI 2024** **Multi-view Stereo of an Object Immersed in a Refractive Medium**
R. Bruneau, B. Brument, L. Calvet, M. Cassidy, J. Mélou, Y. Quéau, J.-D. Durou, F. Lauze. *Journal of Electronic Imaging* 33(3), SPIE · doi:10.1117/1.JEI.33.3.033005

**SSVM 2023** **On Photometric Stereo in the Presence of a Refractive Interface**
Y. Quéau, R. Bruneau, J. Mélou, J.-D. Durou, F. Lauze. *Scale Space and Variational Methods in Computer Vision*, Springer · hal-04038233

**QCAV 2023** **A Shape-from-Silhouette Method for 3D Reconstruction of a Convex Polyhedron**
B. Brument, L. Calvet, R. Bruneau, J. Mélou, S. Gasparini, Y. Quéau, F. Lauze, J.-D. Durou. *Quality Control by Artificial Vision*, Proc. SPIE 12749 · doi:10.1117/12.3000368

**Thesis 2024** **3D Reconstruction with Refraction**
R. Bruneau. University of Copenhagen & University of Toulouse · tel-05311063

* equal contribution

## OPEN-SOURCE CODE & DATA

- Martine – dataset (doi:10.7910/DVN/2BEPEH), evaluation and registration tools: github.com/martine-benchmark
- RNb-NeuS2 – CUDA implementation: github.com/RobinBruneau/RNb-NeuS2
- RNb-NeuS – github.com/bbrument/RNb-NeuS
- Meshroom / AliceVision – integration of multi-view multi-light reconstruction: github.com/alicevision/meshroom

## TEACHING, SUPERVISION & SERVICE

- **Teaching** – Teaching Assistant, *Numerical Optimisation*, University of Copenhagen (DIKU): 3 editions, 7 weeks × 7 h/week (about 150 h in total).
- **Supervision** – co-supervision of one Master's student.
- **Reviewing** – CVPR.

## SKILLS

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|---|---|
| **3D Vision** | Multi-View Stereo, photometric stereo (PS, MVPS), Structure-from-Motion, inverse rendering, multi-view geometry, refraction modelling, shape-from-silhouette, face tracking |
| **Neural rendering** | neural implicit surfaces (NeuS, NeuS2, Instant-NGP), NeRF, 3D/2D Gaussian Splatting, deep learning |
| **Mathematics** | numerical optimisation, inverse problems, non-linear least squares |
| **Programming** | Python, PyTorch, CUDA, C++, Matlab, Git, Linux, LaTeX |
| **3D software** | COLMAP, Meshroom/AliceVision, Blender, Open3D |
| **Agentic AI** | LLM-agent assisted development (Claude Code), agent orchestration, MCP |
| **Languages** | French (native), English (fluent, working language since 2021) |