

Antoine N. André

COMPUTER VISION · OMNIDIRECTIONAL CAMERAS · ROBOTICS AND MICROROBOTICS

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☎ (+81)80-4780-5989 | ✉ antoine.andre@aist.go.jp | 30 years old

Researcher at CNRS-AIST JRL (Joint Robotics Laboratory), IRL 3218

Education

Ph.D. on nanometric resolution 6-DoF pose measurement

Besançon, France

UBFC (BURGUNDY FRANCHE-COMTÉ UNIVERSITY)

Oct. 2018 - Oct. 2021

- Title of the Ph.D. thesis (defended on Oct. 18 2021): Robust visual measurement with large range to resolution ratio of 3D pose of encoded periodic patterns : applications to microrobotics
- Under the supervision of Guillaume Laurent, Patrick Sandoz and Maxime Jacquot
- Thesis comity composed by Éric Marchand, Peter Sturm and Youcef Mezouar
- Funded by the Ministry of Higher Education, Scientific Research and Innovation (MESRI)

Master in Microsystems, Instrumentation and Robotics

Besançon, France

UFC (FRANCHE-COMTÉ UNIVERSITY)

2017 - 2018

- Double degree made in parallel of the last year of engineering school to deepen knowledges in robotics.

Engineering degree in mechatronics and robotics

Besançon, France

SUPMICROTECH ENSMM (NATIONAL ENGINEERING INSTITUTE IN MECHANICS AND MICROTECHNOLOGIES)

2015 - 2018

- Specialization in mechatronics and robotics, courses included command, control, robotics and computer vision.

Research experience

Permanent researcher

Tsukuba, Japan

CNRS-AIST JRL (JOINT ROBOTICS LABORATORY), IRL3218

Oct. 2023 -

- Perception research team principal investigator (Apr. 2025 -)

Postdoctoral researches in robotics and computer vision

Tsukuba, Japan

CNRS-AIST JRL (JOINT ROBOTICS LABORATORY), IRL3218

May 2022 - Sept. 2023

- JSPS Postdoctoral fellow (May 2022 - May 2023)
- AIST ITH postdoctoral contract (May 2023 - Sept. 2023)

Postdoctoral researches in robotics and computer vision

Amiens, France

MIS RESEARCH LABORATORY, UNIVERSITY PICARDIE JULES VERNE

Dec. 2021 - Apr. 2023

International mobility and collaboration for vision based measure with high resolution

Tsukuba, Japan

NATIONAL METROLOGY INSTITUTE OF JAPAN (NMIJ)

Mar. 2020 - Aug. 2020

- Collaboration with Shien Ri, Professor at the National Metrology Institute of Japan
- international mobility grant from EUR EiPhi, canceled because of borders closing

PhD main subject

Besançon, France

AS2M RESEARCH DEPARTMENT OF FEMTO-ST INSTITUTE

2018 - 2021

- 6 DoF pose measurement performed via the spectral analysis of periodic patterns
- C++ Software Development Kit for pose measurement of various periodic pattern types available at [Vernier website](#)
- Collaborations inside the research laboratory to provide a reliable, robust and precise position measurement tool for microrobotics applications

Master thesis in biomechanical robotics

Tokyo, Japan

TOKYO DENKI UNIVERSITY

Feb. 2018 - Aug. 2018

- Supervised by Pr. Jun Ishikawa

Supervision

Master students

- **Louis Ruble** (Technology University of Compiègne, autumn 2025), development of a benchmark for user feedback in teleoperation
- **Ferdinand Louapre** (Mines de Paris, spring 2025), Hessian shaping for enhanced convergence domain Visual Servoing Schemes
- **Raphaël d’Orfani** (Polytech Dijon, spring 2025), RGB-D fusion for wide field of view user feedback in teleoperation context
- **Damien Harlé** (Rubika Valenciennes, summer 2024), user feedback enhancement with wide FoV cameras for robot teleoperation
- **Gwendal Crequer** (ENSTA Bretagne, spring 2024), robot masking for Spherical Visual Servoing using omnidirectional cameras
- **Thomas Duvinage** (UTBM, autumn 2023), encapsulate spherical Visual Servoing in a multi-objective control framework
- **Mathieu Quaccia** (INSA Toulouse, spring 2023, co-supervision), implementation of feature maps for Direct Visual Servoing
- **Quentin Milot** (INSA Rennes, spring 2022, co-supervision), Adaptation for omnidirectional cameras of a V-SLAM algorithm
- **Valériia Leush** (ENSMM, spring 2021), Software development of a python tool, based on the Vernier library, to generate and measure periodic pattern poses

Bachelor students

- **Sinta Schulte** (bachelor’s degree, KIT, summer 2024), Visual Servoing trajectory evaluation comparison using various FoV

Research funding

D-φ Apr. 2025 - March 2028
REMOTE DEFORMATION AND FORCE ESTIMATION

- Funded by the JSPS (Kakenhi Wakate)
- Budget : 950 k¥
- Role: principal investigator

CALL (ANR) Sept. 2025 - Aug. 2028
DYNAMIC OBJECT HANDOVER USING FULL SPHERICAL VISUAL PERCEPTION AND BIOMECHANICAL MODELING OF HUMANS

- Funded by the French ANR
- Coordinator: B. Watier (CNRS-LAAS). 4 laboratories involved CNRS-LAAS (France), ENIT LGP (France) UDS 3IT (Canada) and CNRS-AIST JRL (Japan)
- Budget : 6 m€
- Role: investigator as a CNRS-AIST JRL member

Antnoid’ (ANR) Jan. 2025 - June 2028
LEVERAGING ANTS VISUAL FAMILIARITIES FOR HUMANOID ROBOT NAVIGATION

- Funded by the French ANR
- Coordinator: G. Caron (CNRS-AIST JRL) with F. Ruffier (AMU ISM)
- Budget : 3 m€
- Role: investigator as a CNRS-AIST JRL member

Phase based deformation estimation (AIST-ITH) Aug. 2024 - Feb. 2025
LEVERAGING WIDE FoV CAMERAS FOR REMOTE DEFORMATION ESTIMATION

- Funded by the ITH department of AIST
- Budget : 1 m ¥
- Role: principal investigator

M²SV Jan. 2024 - Jan. 2026
MOBILE MANIPULATOR CONTROL BASED ON SPHERICAL VISION

- Exploratory research project of the GdR 720 ISIS
- Coordinator: N. Crombez (CIAD UTBM), 3 laboratories involved CIAD UTBM (France), UPJV MIS lab (France) and CNRS-AIST JRL (Japan)
- Budget : 7 k€
- Role: participant as CNRS-AIST JRL member

BRIDGE SIGRoLe (NTT) Nov. 2023 - March 2026
SELF-IMPROVING AI FOR SEAMLESS HUMAN-GUIDED ROBOT LEARNING

- Funded by NTT Data
- Coordinator: R. Cisneros (CNRS-AIST JRL), in collaboration with CMU (United-States)
- Budget : 70 m ¥
- Role: investigator

DVS-Straight 2021 - 2024
AIST ITH INTERNATIONAL COLLABORATION DVS-STRAIGHT - DIRECT VISUAL SERVOING WITH OPTIMAL ROBOT TRAJECTORIES

- Funded by the ITH department of AIST
- Coordinator: G. Caron, 3 laboratories involved UTBM, CIAD lab (France), UPJV, MIS lab (France) and CNRS-AIST JRL (Japan)
- Role: participant as CNRS-AIST JRL member

Holonet

TOWARD EXTENDED VISUAL CONTROL CAPABILITIES USING DIGITAL HOLOGRAPHY

2020 - 2023

- Funded by the I-Site Burgundy Franche-Comté
- 4 departments of FEMTO-ST Institute involved: Optics, Applied mechanics, DISC and AS2M departments
- Budget : 150 k€
- Role: participant as AS2M FEMTO-ST member

NANO6D

6 DEGREES OF FREEDOM NANOMETROLOGY

2018 - 2021

- Funded by the Burgundy Franche-Comté region
- 3 departments of FEMTO-ST Institute involved: AS2M, Applied mechanics and Optics departments
- Budget : 235 k€
- Role: participant as AS2M FEMTO-ST member

AI-Control-Net

NEURAL NETWORKS APPLIED TO MICROROBOTICS AND PHOTONICS

2017 - 2021

- Funded by the Burgundy Franche-Comté region
- 4 departments of FEMTO-ST Institute involved: Optics, Applied mechanics, DISC and AS2M departments
- Budget : 68 k€
- Role: participant as AS2M FEMTO-ST member

Publications

 [ORCID](#)  [Research Gate](#)  [Google Scholar](#)

PEER REVIEWED PUBLISHED ARTICLES

- [1] **André, A. N.**, Morbidi, F., & Caron, G. (2025). UniphorM: A New Uniform Spherical Image Representation for Robotic Vision, *IEEE Transactions on Robotics*, 41, 2322-2339, DOI [10.1109/TRO.2025.3547266](https://doi.org/10.1109/TRO.2025.3547266)
- [2] Benallegue, M., Lorthioir, G., Dallard, A., Cisneros-Limón, R., Kumagai, I., Morisawa, M., Kaminaga, H., Murooka, M., **André, A. N....** & Kamon, M. (2025). Humanoid robot RHP Friends: Seamless combination of autonomous and teleoperated tasks in a nursing context, *IEEE Robotics & Automation Magazine*, 32(1), 79-90, DOI [10.1109/MRA.2024.3521995](https://doi.org/10.1109/MRA.2024.3521995)
- [3] Crombez, N., Buisson, J., **André, A. N.**, & Caron, G. (2024). Dual-hemispherical photometric visual servoing, *IEEE Robotics and Automation Letters*, 9(5), 4170-4177., DOI [10.1109/LRA.2024.3375114](https://doi.org/10.1109/LRA.2024.3375114)
- [4] **André, A. N.**, Lehmann, O., Govilas, J., Laurent, G. J., Saadana, H., Sandoz, P., Gauthier, V., Lefèvre, A., Bolopion, A., Agnus, J., Placet, V. & Cévy, C. (2022). Automating Robotic Micro-Assembly of Fluidic Chips and Single Fiber Compression Tests Based-on $XY\Theta$ Visual Measurement With High-Precision Fiducial Markers, *IEEE Transactions on Automation Science and Engineering*, 21(1) 353-366, DOI [10.1109/TASE.2022.3218686](https://doi.org/10.1109/TASE.2022.3218686)
- [5] Cuenat, S., Andréoli, L., **André, A. N.**, Sandoz, P., Laurent, G. J., Couturier, R., & Jacquot, M. (2022). Fast autofocusing using tiny transformer networks for digital holographic microscopy. , *Optics Express*, 30(14), 24730-24746., DOI [10.1364/OE.458948](https://doi.org/10.1364/OE.458948)
- [6] **André, A. N.**, Sandoz, P., Jacquot, M., & Laurent, G. J. (2022). Pose Measurement at Small Scale by Spectral Analysis of Periodic Patterns., *International Journal of Computer Vision*, 1-17, DOI [10.1007/s11263-022-01607-7](https://doi.org/10.1007/s11263-022-01607-7)
- [7] **André, A. N.**, Sandoz, P., Mauzé, B., Jacquot, M., & Laurent, G. J. (2020). Sensing one nanometer over ten centimeters: A microencoded target for visual in-plane position measurement., *IEEE/ASME Transactions on Mechatronics*, 25(3), 1193-1201., DOI [10.1109/TMECH.2020.2965211](https://doi.org/10.1109/TMECH.2020.2965211)
- [8] **André, A. N.**, Sandoz, P., Mauzé, B., Jacquot, M., & Laurent, G. J. (2020). Robust phase-based decoding for absolute (X, Y, Θ) positioning by vision., *IEEE Transactions on Instrumentation and Measurement*, 70, 1-12., DOI [10.1109/TIM.2020.3009353](https://doi.org/10.1109/TIM.2020.3009353)
- [9] Mauzé, B., Dahmouche, R., Laurent, G. J., **André, A. N.**, Rougeot, P., Sandoz, P., & Clévy, C. (2020). Nanometer precision with a planar parallel continuum robot., *IEEE Robotics and Automation Letters*, 5(3), 3806-3813., DOI [10.1109/LRA.2020.2982360](https://doi.org/10.1109/LRA.2020.2982360)

INPROCEEDINGS ARTICLES

- [10] d'Orfani, R., **André, A. N.**, Benallegue, M., Cisneros-Limón, R. & Caron, G. (2026, January). RGB-D Fusion for Wide Field of View User Feedback in Teleoperation Context, *Proceedings of the IEEE/SICE International Symposium on System Integration (2026)*
- [11] Caillot, A., **André, A. N.**, Duvinage, T., & Caron, G. (2025, September). RGB-D versus omnidirectional visual SLAM in humanoid robot positioning, *Proceedings of the IEEE-RAS 24th International Conference on Humanoid Robots (2025)*
- [12] Schulte, S., **André, A. N.**, Crombez, N., & Caron, G. (2025, January). On the impact of the camera field-of-view to Direct Visual Servoing robot trajectories when using the Photometric Gaussian Mixtures as dense feature, *Proceedings of the IEEE/SICE International Symposium on System Integration (2025)*
- [13] Quaccia, M., **André, A. N.**, Yoshiyasu, Y., Caron, G., A Study on Learned Feature Maps Toward Direct Visual Servoing, *Proceedings of the IEEE/SICE International Symposium on System Integration (2024)*
- [14] Berenguel-Baeta, B., **André, A. N.**, Caron, G., Bermudez-Cameo, J., & Guerrero, J. J. (2023). Visual Gyroscope: Combination of Deep Learning Features and Direct Alignment for Panoramic Stabilization., *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPS) Workshops (pp. 6444-6447).*
- [15] **André, A. N.**, & Caron, G. (2022). Photometric Visual Gyroscope for Full-View Spherical Camera., *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops (pp. 5232-5235).*
- [16] **André, A. N.**, Sandoz, P., Jacquot, M., & Laurent, G. J. (2020, July). Robust, precise and scalable: A phase-encoded pattern for visual X , Y , Θ positioning., *2020 International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS) (pp. 1-5). IEEE. Présentation annulée pour causes de fermeture des frontières*, DOI [10.1109/MARSS49294.2020.9307842](https://doi.org/10.1109/MARSS49294.2020.9307842)

ORAL COMMUNICATIONS

- [17] **André, A. N.**, Sandoz, P., Jacquot, M., & Laurent, G. J. High-resolution 3D pose sensing from nano- to macro-scale by phase-based computer vision., *SPIE Photonics Europe 2022, 3 - 7 Apr. 2022*
- [18] Andreoli, L., Cuenat, S., **André, A. N.**, Sandoz, P., Couturier, R., Laurent, G. J., & Jacquot, M. Extended machine vision control capabilities using digital holography and transformer neural networks., *SPIE Photonics West 2022, 22 - 27 Jan. 2022*
- [19] **André, A. N.**, Sandoz, P., Mauzé, B., Jacquot, M., & Laurent, G. J. (2020). Sensing one nanometer over ten centimeters: A microencoded target for visual in-plane position measurement., *2020 International Conference on Advanced Intelligent Mechatronics (AIM 2020), Boston, USA (online)*

PATENTED SOFTWARE

- [20] **André, A. N.**, Sandoz, P., & Laurent, G. J., Vernier Library software, deposited at the National Agency for the Programs protection (Agence pour la Protection des Programmes)., *identifiant IDN.FR.001.510013.000.S.P.2020.000.41100, Dec. 2020.*

Participation in international conferences, symposia and outreach _____

2025 IEEE-RAS 24th International Conference on Humanoid Robots	Seoul, Korea
2025 IEEE/SICE International Symposium on System Integration, Session chair	Munich, Germany
2024 27e Journée Francophone de la Recherche (Nov. 2024)	Tokyo, Japan
2024 IEEE International Conference on Robotics and Automation	Yokohama, Japan
2024 IEEE/SICE International Symposium on System Integration	Ha-Long, Vietnam
2023 26e Journée Francophone de la Recherche (Jan. 2023)	Tokyo, Japan
2022 IEEE/RSJ International Conference on Intelligent Robots and System	Kyoto, Japan
2022 IEEE / CVF Computer Vision and Pattern Recognition Conference	New Orleans, USA
2022 SPIE Photonics Europe	Strasbourg, France
2021 21th International Symposium on Optomechatronic Technology	Besançon, France
2021 IEEE/ASME International Conference on Advanced Intelligent Mechatronics	Virtual
2021 IEEE International Conference on Robotics and Automation	Virtual

Invited talks

Omnidirectional vision for robotic applications

SUNY

Seoul, Korea

Oct. 2025

Omnidirectional vision for robotic applications

SNU, DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Seoul, Korea

Sept. 2025

Vision sphérique en robotique : représentation d'image et applications

JOURNÉE INTER-GDR ISIS ET ROBOTIQUE - CAPTEURS VISUELS ÉMERGENTS POUR LA ROBOTIQUE

Paris, France

Nov. 2022

Mesure visuelle à grand rapport plage sur résolution de la pose 3D de mires pseudo périodiques

MIS UPJIV PERCEPTION TEAM

Amiens, France

Sept. 2021

Teaching

Computer vision practical courses (108 hrs, classes of 15 students)

M2 ENSMM STUDENTS (FINAL YEAR OF ENGINEERING SCHOOL)

Besançon, France

Nov. 2018 - Jan. 2021

- Practical courses topics include camera calibration, homography, triangulation and stereo vision for object reconstruction
- Creation and writing of the practical courses subjects

Microcontrollers practical courses (20 hrs, classes of 15 students)

M1 ENSMM STUDENTS (SECOND YEAR OF ENGINEERING SCHOOL)

Besançon, France

Apr. 2020 - May 2020

- Command and control of Microcontrollers (PIC16F) courses

Knowledge of foreign languages

- French: Mother tongue
- English: Excellent knowledge of the spoken and written language
- Japanese: Basic knowledge of the spoken and written language