Curriculum Vitae of Alice Barbora TUMPACH

- **PERSONAL INFORMATION**

Family Name, First Names : TUMPACH, ALICE BARBORA

Civil status: Female, born on September 12, 1976, 3 children, divorced, French.

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URL for web site : http://math.univ-lille1.fr/~tumpach/Site/home.html

- **PROJECT LEADER**

2021–2025: P.I. of the Austrian part financed with 306.768 euros of the Austrian-Polish FWF-NCN-Project "Banach Poisson-Lie Groups and Integrable systems" in collaboration with Tomasz Goliński from the University of Białystok, Poland.

- **CURRENT POSITIONS**

2021–present: P.I. of the FWF-Project "Banach Poisson-Lie Groups and Integrable systems".

2021–present: Master studies in Computer Vision, TU-Wien, Vienna, Austria.

2018–present: Visiting Professor at Wolfgang Pauli Institut, Uni-Wien, Vienna, Austria.

2007–present: Assoc. Prof. in Mathematical Physics, Lille University, France.

- **PREVIOUS POSITIONS**

2019–2020: CNRS grantee (1.5 year), Pauli Institut, Vienna, Austria.

2018–2019: On leave for parental duties from Lille University. Teacher at Lycée Français de Vienne.

2007–present: Assistant Professor in Mathematics, Lille University, France.

2015–2016: On leave for parental duties.

2014–2015: CNRS grantee (1 year), Pauli Institut, Vienna, Austria.

2013: CNRS grantee (6 month), Dept of Computer Science, Lille, France.

2012: Long-term mission (6 month) at Pauli Institut, Vienna, Austria.

2005–2007: Post-doctoral position at EPFL, Switzerland.

- **SUPERVISION AND CO-SUPERVISION OF STUDENTS**

2021: Francesco Cattafi, Post-doc student, supervision.

2021: Ioana Ciuclea, PhD student of Cornelia Vizman at West University of Timisoara, co-supervision.

2012-2013: Karolina Golec, Master Student at Mines-Telecom, co-supervision.

- **EDUCATION**

2022: Habilitation, Lille.

2021–Present: Master in Visual Computing, TU, Vienna, Austria.

2001–2005: PhD in Mathematics at École Polytechnique, Palaiseau, France. PhD Advisor : Paul Gauduchon. Date of delivery : 14.03.2006.

2000–2001: French teaching competitive exam called Agrégation.

1998–2000: Master in Pure Mathematics (Paris 6 & Paris 7).

1997–1998: Bachelor in Mathematics, ÉNS Ulm, Paris.

1997–1998: Bachelor in Physics, ÉNS Ulm, Paris.

- **LANGUAGES:** quadrilingual in *French, German, Czech, English.*
- **PROGRAMMING LANGUAGES:** Python, Matlab, HTML, JavaScript, CSS.
- **CAREER BREAKS**

  2021: On leave for Training (10 months), Master in Visual Computing, TU Wien, Austria.

  2020: Home-schooling for 3 kids.

  2018–2019: On leave for parental duties from Lille University (12 months), teacher at Lycée Français de Vienne, Austria.

  2015–2016: On leave for parental duties (12 months)

  2012: Maternity leave 3rd child (6,5 months)

  2010: Maternity leave 2d child (4,5 months)

  2008: Maternity leave 1rst child (4 months)

- **TEACHING ACTIVITIES**

  2018–2019: Teaching Duties of 720 hours at Lycée français de Vienne.

  2007–2017: Teaching Duties of 192 hours/year, Bachelor & Master 2, Lille.

  2005–2007: Teaching Assistant, Master 1, EPFL, Switzerland.

  2001–2005: Teaching Assistant, Bachelor 1 & 2, Paris 11, France.

- **INSTITUTIONAL RESPONSIBILITIES**

  2017: PhD Thesis Jury of Alice Le Brigant, Bordeaux University, France.

  2017: Member of Hiring Committee for Maître de conférence, Lille, France.

  2013: Member of Hiring Committee for Maître de conférence, Lille, France.

  2011: Member of Hiring Committee for Maître de conférence, Chambéry.

  2008–2011: Organizer of Internal Seminar in *Mathematical Physic*, Lille.

  2011: Co-organizer of seminar *Geodesic flows and their quantification.*

  2006–present: Referee for the following International Journals : *Mathematische Annalen, Journal of Differential Geometry, Annales de l'Institut Fourier, Journal of Geometric Mechanics, Journal of Mathematical Physics, Journal of Symplectic Geometry, Journal of Mathematical Analysis and Applications, Advances in Applied Clifford Algebras, Journal Royal Society Interface, Journal of Mathematical Imaging and Vision, Springer Lecture Notes in Computer Science, International Journal of Mathematics and Mathematical science.*

- **ORGANISATION OF SCIENTIFIC MEETINGS**

  2021: Organization of "A finite and infinite-dimensional meeting on Lie groupoid, Poisson geometry and integrability", 16–20.08.2021, Vienna, https://sites.google.com/view/finite-infinite-workshop/

  2019: Working groups on non-linear flag manifolds at WPI, Vienna.

  2011: Principal organizer of the Workshop *What is the Schwarzienne Derivative?*, 23-24/11/2011, Lille University, France, 20 participants.

  2011: Co-organizer of the Workshop *Geometric flows in finite or infinite dimensions*, 28/02/2011-4/03/2011 (5th week of the Program *Complex and Riemannian Geometry*), CIRM, Marseille, France, 45 participants.

  2010: Organizer of the Workshop *A Journey in infinite dimensions*, 21/09/2010, Lille University, France, 20 participants.

- **SELECTED PRESENTATIONS :**

  2022: CIMPA Lecturer, Thiès, Senegal, CIMPA School on *Mathématiques en analyse et traitement du signal, des images et des données.*

  2022: *Banach Poisson-Lie groups*, XXXIX Workshop on Geometric methods in Physics, Białystok.

  2020: Mini-Course on infinite-dimensional Geometry, 15th International Young Researchers Workshop on Geometry, Mechanics, and Control, Utrecht. http://utrechtgeometrycentre.nl/15iyrw/

2019: Invited speaker at Workshop Information Geometry, ENAC, Toulouse.

2019: Invited speaker at XXVIII International Fall Workshop on Geometry and Physics, Instituto de ciencias Matemáticas, Madrid, Spain.

2018: Plenary talk at GAP XVI, Séminaire Itinérant de Géométrie et Physique, conference on *Lie Theory and Applications to Math. Physics.*

2017: Keynote speaker at GSI2017, conf. in Computer Science on *Geometric Science of Information.*

2017: Lecture course on *Hilbert, Banach and Fréchet manifolds* at VI Advanced School on Geometry and Physics, Białowieża, Poland.

2016: *Banach Poisson-Lie groups and the restricted Grassmannian*, XXXV Workshop on Geometric methods in Physics, Białowieża, Poland.

2010: *Root theory of L^*-algebras and Applications*, Oberwolfach, Germany.

2007: *The Universal Teichmüller space*, CIRM, Marseille, France.

2005-2016: Seminars at M.I.T., University of California, EPFL, ÉNS ULM, Humboldt Univ. Berlin .

- **EARLY ACHIEVEMENTS TRACK-RECORD**

I have two main domains of expertise :

(i) infinite-dimensional Geometry of manifolds modeled on Banach or Fréchet spaces and

(ii) Geometric Methods applied in Computer science, in particular in Shape Analysis.

The area of expertise (i) is my field of training. I have published 7 theoretical papers on different aspects of infinite dimensional geometry in leading international peer-reviewed journals, including 2 papers in *Journal of Functional Analysis*, 1 paper in *Annales de l'Institut Fourier*, and 1 paper in *Communications in Mathematical Physics*. It is remarkable that I am the only author of most of these papers. I have been invited to give mini-courses on infinite dimensional geometry at a CIMPA school in Senegal in May 2022, and at the 15th International Workshop of Young Researchers on Geometry, Mechanics and Control, in Utrecht in December 2020. The Mini-Courses have been recorded and are or will be available on Youtube (http://utrechtgeometrycentre.nl/15iyrw/, https://www.cimpa.info/en/node/7077). In the summer of 2017, I was invited to give a lecture on Hilbert, Banach and Fréchet manifolds at the Advanced School on Geometry and Physics, as part of the XXXVI Workshop on Geometric methods in Physics, in Białowieża, Poland. The audience was composed of experts and students.

I developed my training in the area of expertise (ii) during and after a 6-month stay at the Computer Science Department of the University of Lille, funded by a CNRS grant. In particular, I acquired implementation skills, which I deepened with Master's studies in Visual Computing at TU Wien, Austria, including *Machine Learning* and *Deep Learning Algorithms*. I was invited as a keynote speaker at the GSI2017 conference on the topic *Geometric Information Science* which was held on November 7–9, 2017 in Paris. The video of my talk as well as the session dedicated to *Women in Science* that I organized are available online on the conference webpage (keynote lecture, Gender Equality).

Moreover I was invited to write a popular paper for the *Notices of American Mathematical Society* about Shape Analysis of curves and surfaces (available on my homepage). This invitation demonstrate my skills in disseminating top-level research to a large audience made of experts and no-experts.

- **5 SELECTED PUBLICATIONS :**

- A.B. Tumpach, *Banach Poisson–Lie groups and Bruhat-Poisson structure of the restricted Grassmannian*, Commun. Math. Phys. 373, 795–858 (2020). https://doi.org/10.1007/s00220-019-03674-3
- D. Beltita, T. Golinski, A.B. Tumpach, *Queer Poisson brackets,* Journal of Geometry and Physics 132, (2018), 358–362. https://doi.org/10.1016/j.geomphys.2018.06.013
- A.B. Tumpach, S. C. Preston, *Quotient Elastic Metrics on the manifold of arc-length parameterized plane curves,* J. of Geometric Mechanics 9, n°2 (2017), 227–256. https://doi.org/10.3934/jgm.2017010
- A.B. Tumpach, H. Drira, M. Daoudi, A. Srivastava, *Gauge Invariant Framework for Shape Analysis of Surfaces.* IEEE Transactions on Pattern Analysis and Machine Intelligence, January 2016, Volume 38, Number 1. https://doi.org/10.1109/TPAMI.2015.2430319
- D. Beltita, T. Ratiu, A. B. Tumpach, *The restricted Grassmannian, Banach Lie-Poisson spaces and coadjoint orbits,* Journal of Functional Analysis, 247 (2007) 138–168. http://math.univ-lille1.fr/∼tumpach/Site/research_files/grassm_final.pdf

LIST OF PUBLICATIONS OF ALICE BARBORA TUMPACH

In Peer-reviewed Journals

- E. Pierson, M. Daoudi, A.B. Tumpach, *A Riemannian Framework for Analysis of Human Body Surface* , Conference: Winter Conference on Applications of Computer Vision (WACV 2022), https://www.researchgate.net/publication/355545398

- A.B. Tumpach, *Banach Poisson–Lie groups and Bruhat-Poisson structure of the restricted Grassmannian*, *Commun. Math. Phys.* 373, 795–858 (2020). https://doi.org/10.1007/s00220-019-03674-3 http://math.univ-lille1.fr/∼tumpach/Site/research_files/Bruhat_Poisson.pdf

- D. Beltita, T. Golinski, A.B. Tumpach, *Queer Poisson brackets,* Journal of Geometry and Physics 132, (2018), 358–362. https://doi.org/10.1016/j.geomphys.2018.06.013

- A.B. Tumpach, S. C. Preston, *Quotient Elastic Metrics on the manifold of arc-length parameterized plane curves,* Journal of Geometric Mechanics 9, n°2 (2017), 227–256. https://doi.org/10.3934/jgm.2017010

- A.B. Tumpach, *Gauge Invariance of degenerate Riemannian metrics,* Notices of American Mathematical Society, April 2016. http://math.univ-lille1.fr/∼tumpach/Site/research_files/Notices_full.pdf

- A.B. Tumpach, H. Drira, M. Daoudi, A. Srivastava, *Gauge Invariant Framework for Shape Analysis of Surfaces.* IEEE Transactions on Pattern Analysis and Machine Intelligence, January 2016, Volume 38, Number 1. https://doi.org/10.1109/TPAMI.2015.2430319

- A. B. Tumpach, *On the classification of infinite-dimensional Hermitian-symmetric affine coadjoint orbits,* Forum Mathematicum 21 :3 (May 2009) 375–393. http://math.univ-lille1.fr/∼tumpach/Site/research_files/classification.pdf

- A. B. Tumpach, *Infinite-dimensional hyperkähler manifolds associated with Hermitian-symmetric affine coadjoint orbits,* Annales de l'Institut Fourier, Tome 59 (2009) – Fascicule 1, 167–197. http://math.univ-lille1.fr/∼tumpach/Site/research_files/paper3.pdf

- D. Beltita, T. Ratiu, A. B. Tumpach, *The restricted Grassmannian, Banach Lie-Poisson spaces and coadjoint orbits,* Journal of Functional Analysis, 247 (2007) 138–168. http://math.univ-lille1.fr/∼tumpach/Site/research_files/grassm_final.pdf

- A. B. Tumpach, *Hyperkähler structures and infinite-dimensional Grassmannians,* Journal of Functional Analysis, 243 (2007) 158–206. https://doi.org/10.1016/j.jfa.2006.05.019

In Proceedings

- A.B. Tumpach and T. Goliński, *The Banach Poisson–Lie group structure of* $\mathrm{U}(H)$, to appear in Proceedings of Workshop on Geometric Methods in Physics 2022, https://arxiv.org/abs/2303.11795

- E. Pierson, M. Daoudi, A.B. Tumpach, *A Riemannian Framework for Analysis of Human Body Surface* , Conference: Winter Conference on Applications of Computer Vision (WACV 2022), https://www.researchgate.net/publication/355545398

- A.B. Tumpach, *An Example of Banach and Hilbert manifold : the Universal Teichmuller space.* Proceedings of XXXVI Workshop on Geometric Methods in Physics, 2-8 July 2017, Białowieża, Poland.

- H. Drira, A.B.Tumpach, M. Daoudi, *Gauge Invariant Framework for Trajectories Analysis,* Conference paper in 1st International Workshop on DIFFerential Geometry in Computer Vision for Analysis of Shapes, Images and Trajectories (DIFF-CV), (2015).

- A.B. Tumpach, *Roots Theory of L*-algebras and Applications.* Oberwolfach Reports, Conference on Infinite Dimensional Lie Theory, 14-20.11.2010, Oberwolfach, Germany

Habilitation Thesis

- A.B. Tumpach, *Some aspects of infinite-dimensional Geoemtry: Theory and Applications*, 212 pages, Habilitation Thesis, Lille University, 9 December 2022.

PhD Thesis

- A.B. Tumpach, *Variétés kählériennes et hyperkählériennes de dimension infinie*, 202 pages, Thèse de doctorat, École polytechnique, soutenue le 26 juillet 2005.
  http://tel.archives-ouvertes.fr/tel-00012012

Preprints

- A.B. Tumpach, *Mostow's Decomposition Theorem for L^*-groups and Applications to affine coadjoint orbits and stable manifolds*, http://fr.arxiv.org/pdf/math-ph/0605039
- A.B. Tumpach, *On canonical parameterizations of $2D$-curves*, https://arxiv.org/abs/2303.15205.
- A.B. Tumpach and S.C. Preston, *3 methods to put a Riemannian metric on Shape Space*, https://arxiv.org/abs/2303.11682
- A.B. Tumpach and P. Kán, *Temporal Alignment of Human Motion Data: A Geometric Point of View*, https://arxiv.org/abs/2303.15259.
- I. Ciuclea, A.B. Tumpach and C. Vizman, *Shape spaces of nonlinear flags*, https://arxiv.org/abs/2303.15184.