CURRICULUM VITAE OF ALICE BARBORA TUMPACH

- **PERSONAL DETAILS**

  Family Name, First Names : TUMPACH, ALICE BARBORA

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

  Orcid Identifier: 0000-0002-7771-6758

  Email: `alice-barbora.tumpach@univ-lille.fr`

  Research Institution: Wolfgang Pauli Institut, Oskar-Morgenstern-Platz 1, A-1090 Vienna

  URL for web site : https://geometricgreenlearning.com

  Publicly accessible link to publications: HAL, ArXiv

- **EDUCATION**

  2024-2025: Certificat on Gender Competences, TU Wien.

  2022: Habilitation in Pure Mathematics, University of Lille, France.
  Habilitation Thesis: *Some aspects of infinite-dimensional Geometry: Theory and Applications*, Tutor: J.-C. Alvarez-Paiva (link)

  2021–Present: Master in Visual Computing, Technical University of Vienna, Austria
  Successfully completed courses including (but not limited to): *Medical Image Processing, Machine Learning for Visual Computing, Computer Vision, 3D Vision, Stereo Vision, Visual Analysis of Human Motion, Software Engineering and Project Management, Virtual and Augmented Reality, Colors, Image Understanding, Visualization 2, Computer Graphics, Advanced Information Retrieval.*

  2001–2005: PhD in Pure Mathematics at École Polytechnique, France, 14.03.2006.
  PhD Thesis: *Infinite-dimensional Kähler and hyperkähler Manifolds,* Advisor: P. Gauduchon (link)

  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.
  Bachelor Thesis: *Quantum Computers*, under the supervision of J.-M. Raimond.

- **LANGUAGES:** *French, German, Czech, English.*

- **PROGRAMMING LANGUAGES:** Matlab, Python, OpenGL, HTML

- **SCIENTIFIC LANGUAGES:** I am at ease with the following scientific languages:

  Mathematics: in particular (but not restricted to) Differential Geometry, Lie Group Theory, Representation Theory, Functional Analysis, Probability Theory, Statistics, Category Theory, Teichmüller Theory

  Physics: in particular (but not restricted to) Mathematical Physics, Theoretical Physics, Quantum Physics, Statistical Physics, Optics, Gauge Theories, Hamiltonian and Lagrangian Mechanics

  Computer Sciences: in particular (but not restricted to) Computer Vision, Computer Graphics, Machine Learning, Medical Image Processing, Shape Analysis, Form recognition, Motion Analysis

  Biology: in particular (but not restricted to) Brain connectivity Analysis, Cancer Research

- **OTHER SKILLS:**

  I am a person with High Emotional Intelligence, with Emotional Quotient of 130. This implies in particular the following soft skills: *Independance, Passionate behavior, Social Responsability, Intuitive Thinking, Resiliency, Sense to details, Consciencious Attitude, Positive Mindset, Sense of Justice, Internal Energy, Creative Intelligence, Arborescent Thinking, Intellectual Curiosity, Ability to trigger change, Ability to take an interest and try to understand, Emotional hyperempathy, Benevolence.*

- **THIRD PARTY FUNDINGS:**
  * FWF AI AUSTRIA Grant PAT 1179524, 2025–2028, 420 887 EUR
  * FWF-NCN Grant I-5015-N, 2021–2025, 306 768 EUR
  * Awarded a funding of 50 000 EUR from Schrödinger Institut, Vienna, Austria, for the organization in 2025 of a Scientific Programme on the topic of my Habilitation Thesis: "Infinite dimensional Geometry: Theory and Applications" (link)
- **AWARDS:**
  * Best paper Award at *Geometric Science of Information* conference, 2023.
- **POSITIONS**

  2025-present: Founder of GAISIDER e.U. (Geometry and Artificial Intelligence for Sustainable and Inclusive Development, Education and Research)

  2025-present: Deputy Head of the Mathematical Artificial Intelligence and Machine Learning Research Division of Wolfgang Pauli Institut

  2025-present: Group Leader of the Geometric-informed Machine Learning group

  2025-present: Research Director at Wolfgang Pauli Institut

  2025–2028: P.I. of the FWF Grant PAT 1179524 "Geometric Green Learning on Groups and Quotient Spaces".

  2021–2025: P.I. of the Austrian-Polish FWF-NCN-Project I-5015-N "Banach Poisson-Lie Groups and Integrable systems" in collaboration with T. Goliński from the University of Białystok, Poland.

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

  2007–present: Associate Professor in Mathematical Physics, Lille University, France (currently on leave).

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

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

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

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

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

- **CAREER BREAKS**

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

  2020: Home-schooling for 3 kids during pandemic (single mom)

  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.

  2010: Maternity leave 2d child.

  2008: Maternity leave 1rst child.

- **NET RESEARCH EXPERIENCE**
  The length of time that I have actually used in net total for research can be decomposed as follows:
  - Time before the completion of doctoral degree: **4 years and 7 months** (Sept. 2001- March 2006)
  - Time after the completion of doctoral degree: **11 years and 3 months** =
    19 years and 1 month (from March 2006 to April 2025)
    - 10 months for Training in Visual Computing
    - 6 months of Pandemia
    - 12 months as teacher
    - 12 months for parental leave
    - 3x18 months for maternity leaves
    (I am using here the ERC convention, see https://erc.europa.eu/apply-grant/parental-leave).

- **RESEARCH EXPERTISES**

  My first domain of expertise is infinite-dimensional Geometry on manifolds modeled on Banach or Fréchet spaces, including Symplectic Geometry, Dynamical Systems, Integrable Systems, Noether Theorem in infinite-dimensions, and Functional Analysis. I have a PhD from École Polytechnique, France, on Kähler and hyperkähler infinite-dimensional manifolds, and a Habilitation from Lille University, France, with title "Some aspects of infinite-dimensional Geometry: Theory and Applications". I have published theoretical papers on different aspects of infinite-dimensional Geometry in leading international peer-reviewed Journals including papers in *Journal of Functional Analysis*, *Annales de l'Institut Fourier*, and *Communications in Mathematical Physics*. Remarkably I am the single author of most of these papers proving my independance as a confirmed researcher. I was invited as Keynote speaker in numerous conferences, including GSI2017, XXVIII International Fall Workshop on Geometry and Physics 2019, PADGE 2023. I gave lecture courses notably on Hilbert, Banach and Fréchet manifolds at the advanced School on Geometry and Physics, part of the XXXVI Workshop on Geometric methods in Physics, and on Nash-Moser Theorem at 15th International Young Researchers Workshop on Geometry, Mechanics, and Control. The slides and videos of my lectures are available online.

  My second domain of expertise is Computer Vision. I started working with Computer Scientists in 2013 during a 6-months visit in the Computer Science Department at Lille University enabled by a CNRS grant. I honed my computer vision skills by enrolling in the Master's program on Visual Computing at Technical University of Vienna, Austria. Successfully completed courses include, but are not limited to, *Medical Image Processing, Machine Learning for Visual Computing, Computer Vision, 3D Vision, Stereo Vision, Visual Analysis of Human Motion, Software Engineering and Project Management, Virtual and Augmented Reality, Colors, Image Understanding, Visualization, Computer Graphics, Advanced Information Retrieval.*

  Moreover, I also have a Bachelor degree in Physics from École Normale Supérieure, Paris, France. My scientific background in physics is a source of inspiration for solving concrete problems in computer vision, notably the Gauge Invariant Framework for Shape Analysis of Surfaces that I introduced (link) is clearly based on my knowledge of gauge theories. On this topic, I was invited to write a popular paper for the *Notices of American Mathematical Society* about Shape Analysis of curves and surfaces (link). This invitation was an honor and I did my best to demonstrate my skills in disseminating top-level research to a large audience made of experts and no-experts.

- **MAIN ACHIEVEMENTS**

1. **Infinite-dimensional Geometry on manifolds modeled on Banach or Fréchet spaces**
   - Mostow Decompositions of infinite-dimensional Lie groups and complex homogeneous spaces and induced decompositions of orbits of these groups (selected publication (1))
   - Development of the theory of Banach Poisson–Lie groups, link to integrable systems like the Korteweg-de Vries hierarchy (selected publication (2))
   - Pathologies of infinite-dimensional Poisson Geometry (selected publication (3))
   - Classification of Hermitian-symmetric affine coadjoint orbits of L^*-groups using root theory in Hilbert Lie algebras (selected publication (4))
   - Construction of explicite hyperkähler metrics on complexifications of infinite-dimensional Hermitian-symmetric spaces (selected publications (5)
   - Hyperkähler structure of the cotangent space of the restricted Grassmannian as hyperkähler quotient (selected publication (6))
2. **Geometric Methods applied in Computer science, in particular in Shape Analysis**
   - Introduction of the Gauge Invariant Framework (GIF) for Shape Analysis, allowing the design of green algorithms by bypassing the traditional optimization step on the group of reparameterizations (selected publication (7))
   - Application of the Gauge Invariant Framework to non-linear flags consisting of curves on surfaces embedded in $\mathbb{R}^3$ leading to the best paper award GSI23 (selected publication (8))
   - Definition of canonical parameterizations of curves and applications in medical image processing (selected publication (9)).
   - Transfer of the quotient elastic metric defined on unparameterized plane curves to the manifold of arc-length parameterized curves (selected publication (10)).

- **10 SELECTED PUBLICATIONS:**
  In infinite-dimensional Geometry:

  (1) Tumpach, A.B., *Mostow's Decomposition Theorem for L^*-groups and Applications to affine coadjoint orbits and stable manifolds*, Journal of Geometry and Physics 191 (2023). https://doi.org/10.1016/j.geomphys.2023.104881 http://fr.arxiv.org/pdf/math-ph/0605039

  (2) Tumpach, A.B., *Banach Poisson–Lie groups and Bruhat-Poisson structure of the restricted Grassmannian*, Communications in Mathematical Physics 373, 795–858 (2020). https://doi.org/10.1007/s00220-019-03674-3

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

  (4) Tumpach, A.B., *On the classification of infinite-dimensional Hermitian-symmetric affine coadjoint orbits,* Forum Mathematicum 21 :3 (May 2009) 375–393. https://doi.org/10.1515/FORUM.2009.018

  (5) Tumpach, A.B., *Infinite-dimensional hyperkähler manifolds associated with Hermitian-symmetric affine coadjoint orbits,* Annales de l'Institut Fourier, Tome 59 (2009) – Fascicule 1, 167–197, https://doi.org/10.5802/aif.2428

  (6) Tumpach, A.B., *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 applications to Computer Vision:

  (7) Tumpach, A.B., Drira, H., Daoudi, M., Srivastava, A., *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

  (8) Ciuclea, I., Tumpach, A.B. and Vizman, C., *Shape spaces of nonlinear flags*, Geometric Science of Information, 6th International Conference, GSI 2023, Proceedings, Part I, 41–50, Springer, 2023. **Best Paper Award**. https://doi.org/10.1007/978-3-031-38271-0_5

  (9) Tumpach, A.B., *On canonical parameterizations of 2D curves*, Geometric Science of Information, 6th International Conference, GSI 2023, Proceedings, Part I, 31–40, Springer, 2023. https://doi.org/10.1007/978-3-031-38271-0_4

  (10) Tumpach, A.B., Preston, S.C., *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

- **ADDITIONAL RESEARCH ACHIEVEMENTS**

  1. **Contribution to conferences:**
     - Organization of a 5-week Thematic Program at Schroedinger Institut, January-February 2025 entitled "Infinite dimensional Geometry: Theory and Applications",
     - Organization of "A finite and infinite-dimensional meeting on Lie groupoid, Poisson geometry and integrability", 2021, Vienna,
  2. **Plenary Speaker** at WGMP 2025
  3. **Keynote Speaker** for instance at ENAC 2025, 59th Seminar Sophus Lie 2024, PADGE 2023, XXVIII International Fall Workshop on Geometry and Physics, GSI2017
  4. **Invited Speaker** for instance at LOGML 2025, X Poisson Geometry Workshop and related topics
  5. **Mini-courses** at 15th International Workshop of Young Researchers on Geometry, Mechanics and Control, Utrecht, 2020 (link) and at advanced School on Geometry and Physics, part of the XXXVI Workshop on Geometric methods in Physics
  6. **Significant research projects:** FWF AI AUSTRIA PAT 1179524, 2025–2028, 420 887 EUR
     FWF-NCN Grant I-5015-N, 2021–2025, 306 768 EUR

1. **Peer review activities:**
   * Referee for *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, Comptes Rendus de l'Académie des Sciences...*
   * Reviewer for international research agencies: *United States-Israel Bilateral Science Foundation (2021), NWO – the Dutch Research Council (2023)*

7. **Promotion of junior researchers:**
   * Member of Hiring Committee for Associate Professors in Mathematics:
     Nice (2023), Lille (2017, 2013), Chambery (2011)
   * PhD Jury in Computer Science: E. Tron (2025), E. Maignant (2023), E. Pierson (2022)
   * PhD Jury in Mathematics: O.Cosserat (2023), J. Luna (2022), A. Le Brigant (2017)

8. **Science communication:** A.B. Tumpach, *Gauge Invariance of degenerate Riemannian metrics,* Notices of American Mathematical Society, April 2016. (link)

9. **Knowledge transfer:** CIMPA Lecturer, Thiès, Senegal, CIMPA School on *Mathématiques en analyse et traitement du signal, des images et des données* (link).

LIST OF PUBLICATIONS OF ALICE BARBORA TUMPACH

In Peer-reviewed Journals

In the following papers, the convention is alphabetic order of the authors, unless the contribution of one author is significantly more then the others, marked with a $*$.

- Goliński, T., Larotonda, G. and Tumpach, A.B., *Nijenhuis operators on homogeneous spaces related to C^*-algebras*, to appear in Int. J. of Geometric Methods in Physics, 2025.
  https://arxiv.org/pdf/2410.22055

- Goliński, T., Tumpach, A.B., *Geometry of Integrable Systems Related to the Restricted Grassmannian*, SIGMA 20 (2024), 104.
  https://www.emis.de/journals/SIGMA/2024/104/

*• Tumpach, A.B., Larotonda, G., *Totally geodesic submanifolds in the manifold SPD of symmetric positive-definite real matrices*, Information Geometry 7 (Suppl 2), 913–942 (2024).
  https://doi.org/10.1007/s41884-024-00146-z

- Tumpach, A.B., *Mostow's Decomposition Theorem for L^*-groups and Applications to affine coadjoint orbits and stable manifolds*, Journal of Geometry and Physics 191 (2023).
  https://doi.org/10.1016/j.geomphys.2023.104881
  http://fr.arxiv.org/pdf/math-ph/0605039

- Tumpach, A.B., *Banach Poisson–Lie groups and Bruhat-Poisson structure of the restricted Grassmannian*, Communications in Mathematical Physics 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

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

*• Tumpach, A.B., Preston, S.C., *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

*• Tumpach, A.B., Drira, H., Daoudi, M., Srivastava, A. *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

- Tumpach, A.B., *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
  https://doi.org/10.1515/FORUM.2009.018

- Tumpach, A.B., *Infinite-dimensional hyperkähler manifolds associated with Hermitian-symmetric affine coadjoint orbits,* Annales de l'Institut Fourier, Tome 59 (2009) – Fascicule 1, 167–197, DOI: 10.5802/aif.2428.
  http://math.univ-lille1.fr/∼tumpach/Site/research_files/paper3.pdf
  http://aif.cedram.org/item?id=AIF_2009__59_1_167_0

- Beltita, D., Ratiu, T.S., Tumpach, A.B., *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
  https://doi.org/10.1016/j.jfa.2007.03.001

- Tumpach, A.B., *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 of International Conferences

In the following papers, the convention is alphabetic order of the authors, unless the contribution of one author is significantly more then the others, marked with a $*$.

- Goliński, T., Rahangdale, P. and Tumpach, A.B., *Poisson structures in the Banach setting: comparison of different approaches*, Geometric Methods in Physics XLI, Białowieża, Poland, Springer, 2024.
  https://arxiv.org/pdf/2412.05391

- Gay-Balmaz, F., Ratiu, T.S. and Tumpach, A.B., *The restricted Siegel Disc as coadjoint orbit*, Geometric Methods in Physics XXXX, Workshop, Białowieża, Poland, Springer, 2023.
  https://arxiv.org/abs/2405.13533

*• Goliński, T., Tumpach, A.B., *Integrable system on partial isometries: a finite dimensional picture*, Geometric Methods in Physics XXXX, Workshop, Białowieża, Poland, Springer, 2023.
  https://arxiv.org/pdf/2311.07412.pdf

- Tumpach, A.B., Preston, S.C., *Three methods to put a Riemannian metric on Shape Space*, Geometric Science of Information, 6th International Conference, GSI 2023, Proceedings, Part I, 3–11, Springer, 2023.
  https://arxiv.org/abs/2303.11682,
  https://doi.org/10.1007/978-3-031-38271-0_1

- Tumpach, A.B., *On canonical parameterizations of* $2D$*-curves*, Geometric Science of Information, 6th International Conference, GSI 2023, Proceedings, Part I, 31–40, Springer, 2023.
  https://arxiv.org/abs/2303.15205
  https://doi.org/10.1007/978-3-031-38271-0_4

- Ciuclea, I., Tumpach, A.B. and Vizman, C., *Shape spaces of nonlinear flags*, Geometric Science of Information, 6th International Conference, GSI 2023, Proceedings, Part I, 41–50, Springer, 2023. **Best Paper Award 2023**.
  https://arxiv.org/abs/2303.15184
  https://doi.org/10.1007/978-3-031-38271-0_5

- Tumpach, A.B., Kán, P., *Temporal Alignment of Human Motion Data: A Geometric Point of View*, Geometric Science of Information, 6th International Conference, GSI 2023, Proceedings, Part II, 541–550, Springer, 2023.
  https://arxiv.org/abs/2303.15259,
  https://doi.org/10.1007/978-3-031-38299-4_56

- Pierson, E., Daoudi, M. and Tumpach, A.B.*A Riemannian Framework for Analysis of Human Body Surface*, Conference: Winter Conference on Applications of Computer Vision (WACV 2022),
  DOI: 10.1109/WACV51458.2022.00282
  https://www.researchgate.net/publication/355545398
  https://hal.science/hal-03389592

*• Tumpach, A.B., Goliński, T., *The Banach Poisson–Lie group structure of* $\mathrm{U}(H)$, Geometric Methods in Physics XXXIX, Workshop, Białystok, Poland, Springer, 2022.
  https://arxiv.org/abs/2303.11795
  https://doi.org/10.1007/978-3-031-30284-8_22

- Tumpach, A.B., *An Example of Banach and Hilbert manifold : the Universal Teichmuller space.* Geometric Methods in Physics XXXVI, Workshop, Białowieża, Poland, Springer, 2017.
  https://link.springer.com/chapter/10.1007/978-3-030-01156-7_42
  https://arxiv.org/abs/2303.15165

*• Drira, H., Tumpach, A.B. and Daoudi, M., *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).
  https://hal.science/hal-01534886

Science Communication

- Tumpach, A.B., *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
  https://www.ams.org/journals/notices/201604/rnoti-p342.pdf

Habilitation Thesis

- Tumpach, A.B., *Some aspects of infinite-dimensional Geometry: Theory and Applications*, 212 pages, Habilitation Thesis, Lille University, 9.12.2022.
  http://tel.archives-ouvertes.fr/tel-00012012

PhD Thesis

- Tumpach, A.B., *Variétés kählériennes et hyperkählériennes de dimension infinie*, 202 pages, Thèse de doctorat, École polytechnique, 14.03.2006
  http://tel.archives-ouvertes.fr/tel-00012012

Preprints

- Goliński, T., Larotonda, G. and Tumpach, A.B., *Nijenhuis operators on Banach homogeneous spaces*, ArXiv, 2025.
  https://arxiv.org/pdf/2410.13557
- Tumpach, A.B., *Hyperkaehler Marriage of the two sphere with the hyperbolic space*, ArXiv, 2025.
  https://arxiv.org/pdf/2504.19945
- Tumpach, A.B., *Infinite-dimensional Siegel disc as symplectic and Kaehler quotient*, ArXiv, 2025.
  https://arxiv.org/pdf/2504.19931
- Duits, R., Bellaard, G. and Tumpach, A.B., *Analysis and Computation of Geodesic Distances on Reductive Homogeneous Spaces*, ArXiv, 2025.
  https://arxiv.org/pdf/2504.04878
- Goliński, T., Rahangdale, P. and Tumpach, A.B., *Fréchet Poisson–Lie groups through examples*, in preparation.
- Tumpach, A.B., *Noether Neural Networks*, in preparation.
- Tumpach, A.B., Goliński, T., Needham, T., Shonkwiler, C., *Tight frames, Stiefel manifolds and gradient flow of momentum map related to the restricted Grassmannian*, in preparation.
- Tumpach, A.B., Preston, S.C., *Riemannian metrics on Shape Spaces: Comparison of different constructions*, in preparation.
- Tenenblat, K., Tumpach, A.B., *Special vector fields on Riemannian manifolds of constant sectional curvature*, in preparation.
- Tumpach, A.B. , Maignant, E., *Moving Frames and Canonical Parameterizations of Curves*, in preparation.
- Tumpach, A.B., Maignant, E., *Bouquet of Flowers: a simple visualization technique*, in preparation.
- Needham, T., Tumpach, A.B., and Shonkwiler, C., *Frame Homotopy in Hilbert Spaces*, in preparation.
- Alvarez-Paiva, J.-C., Tumpach, A.B., *Moments and symmetric positive-definite matrices*, in preparation.
- Gay-Balmaz, F., Ratiu, T.S. and Tumpach, A.B., *Some geometric properties of the universal Teichmüller space and the restricted Siegel disc*, in preparation.
- Gay-Balmaz, F., Ratiu, T.S., and Tumpach, A.B., *The hyperkähler metric on the cotangent space of an infinite-dimensional symmetric Hilbert domain*, in preparation.