

# CURRICULUM VITAE

## E. Laurent Younes

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### Current Appointments

- Professor, Department of Applied Mathematics and Statistics, Johns Hopkins University, Baltimore.
- Director of the Center for Imaging Science, Johns Hopkins University.
- Core Faculty member of the Institute for Computational Medicine, Johns Hopkins University.
- Core Faculty Member of the Mathematical Institute for Data Science, Johns Hopkins University.

### Personal Data

- *Address:* Center for Imaging Science, Johns Hopkins University, 3400 North Charles Street, Baltimore, MD 21218.
- *Telephone:* 410 516 5103.
- *Email:* laurent.younes@jhu.edu.

### Education and Training

- 1983-1988: *Ecole Normale Supérieure* (rue d'Ulm), France.
- 1986: *Agrégation in Mathematics* (National Contest for teacher recruitment, rank 4).
- 1989: Ph.D. Université Paris 11. Statistics.
- 1995: *Habilitation à Diriger des Recherches* (Ph.D. advisor certification), University Paris 11.

### Previous Positions

- 1990–1998: *Chargé de Recherche*, CNRS, France.
- 1998–2003: *Directeur de Recherche*, CNRS, France.
- 2003–2005: Associate Professor, Department of Applied Mathematics and Statistics, Johns Hopkins University.
- 2014–2020: Chair, Department of Applied Mathematics and Statistics, Johns Hopkins University.
- 2005–present: Professor, Department of Applied Mathematics and Statistics, Johns Hopkins University.

### Mentoring

- *Ph.D. advisees* (1) Dominique Béréziat, University Paris 11, defended in 1999; (2) Thomas Feldman, ENS de Cachan, defended 2004; (3) Laurent Garcin, ENS de Cachan, defended in 2004;

(4) Sebastien Gadat, ENS de Cachan, defended in December 2004; (5) Joan Glaunès (co-advised with A. Trouvé), ENS de Cachan, defended in 2005; (6) Aastha Jain, Johns Hopkins University, defended in 2011; (7) Felipe Arraté, Johns Hopkins University, defended in 2011; (8) Erdem Yoruk, (co-advised with D. Geman), Johns Hopkins University, defended in 2011; (9) Francisco Sanchez (co-advised with D. Geman), Johns Hopkins University, defended in 2012; (10) Jun Ma, (co-advised with M. Miller), Johns Hopkins University, defended in 2012; (11) Neil Hallonquist, Johns Hopkins University, defended in 2015; (12) Valentina Staneva, Johns Hopkins University; defended in 2017; (13) Kamel Lahouel, Johns Hopkins University; defended in 2018; (14) Dai-Ni Hsieh, Johns Hopkins University; defended in 2021; (15) Vittorio Loprinzo, Johns Hopkins University; defended in 2022; (16) Yiran Xu, Johns Hopkins University; defended in 2022; (17) Michele Lohr, Johns Hopkins University; current; (18) Oscar (Yechen) Liu, Johns Hopkins University; current; (19) An Wang, Johns Hopkins University; current.

- **Post Docs** (1) Joan Glaunès, Center for Imaging Science (2005-06); (2) Stéphanie Allasonnière, Center for Imaging Science (2007-08); (3) Casey Richardson, Center for Imaging Science (2011-13); (4) Saurabh Jain, Center for Imaging Science (2011-13); Xiaoying Tang, Center for Imaging Science (2014); (5) Sylvain Arguillère, Center for Imaging Science (2016-2017); (6) Ruiyi Zhang, Center for Imaging Science (2019-2021).

### **Institutional Administrative Appointments**

- 1999-2002: Co-Director of the DEA (Master's) program: "Mathematics, Vision, Learning", ENS de Cachan.
- 2001-03: Director of the CNRS Research Group: "GDR: Mathematics for Perceptive and Cognitive Systems".
- 2002-03: Director of the DEA (Master's) program: "Mathematics, Vision, Learning", ENS de Cachan.
- 2009-10: One-month invited professorship, ENS de Cachan.
- 2013-14: One-month invited professorship, ENS de Cachan.
- 2020-present: Director of the Data Science Master's program, Johns Hopkins University.

### **Conference Organization**

- Series of international conferences on *Mathematics and image analysis*, 1997 (Luminy), 1999 (Luminy), 2000 (Paris), 2002 (Paris), 2004 (Paris).
- International workshop: *Stochastic Aspects of Vision*, June 2003, ENS de Cachan.
- IMA workshop; *Shape spaces*, 2006, Minneapolis.
- SAMSI workshop: *The Geometry and statistics of shape spaces*, 2006, NC
- Annapolis workshop on *Shape spaces* (2010).

### **Editorial activities**

- Former Associate Editor of: Pattern Recognition Letters, Journal of Mathematical Imaging and Vision, IEEE Transaction in Image Processing
- Associate Editor of the Annals of Applied Statistics

**Participation in Scientific Societies:** Fellow of IMS (2015), AMS (2021) and SIAM (2023).

## Publications

### *Books*

- [1] Laurent Younes. *Invariance, déformations et reconnaissance de formes*. Springer Science & Business Media, 2003.
- [2] Laurent Younes. *Shapes and Diffeomorphisms*. First Edition. Springer Berlin Heidelberg, 2010.
- [3] Laurent Younes. *Shapes and Diffeomorphisms*. Second Edition. Springer Berlin Heidelberg, 2019.

### *Journal articles*

- [4] Laurent Younes. “Couplage de l’estimation et du recuit pour des champs de Gibbs”. In: *Comptes rendus de l’Académie des sciences. Série 1, Mathématique* 303.13 (1986), pp. 659–662.
- [5] Laurent Younes. “Coupling estimation and annealing for Gibbsian fields with finite number of states”. In: *Compte-rendus de l’Académie des Sciences, Serie I-Mathématique* 303.13 (1986), pp. 659–662.
- [6] Laurent Younes. “Parametric inference for imperfectly observed Gibbsian fields”. In: *Probability theory and related fields* 82.4 (1989), pp. 625–645.
- [7] Laurent Younes. “Maximum likelihood estimation for Gibbsian fields”. In: *Lecture Notes-Monograph Series* (1991), pp. 403–426.
- [8] Robert Azencott, Jerome Lacaille, and Laurent Younes. “Machines de Boltzmann synchrones et vision artificielle”. In: *Le Courrier du CNRS* 79 (1992).
- [9] Arnaldo Frigessi, Chii-Ruey Hwang, and Laurent Younes. “Optimal spectral structure of reversible stochastic matrices, Monte Carlo methods and the simulation of Markov random fields”. In: *The Annals of Applied Probability* 2.3 (1992), pp. 610–628.
- [10] Robert Azencott, Antoine Doutriaux, and Laurent Younes. “Synchronous Boltzmann machines and curve identification tasks”. In: *Network: Computation in Neural Systems* 4.4 (1993), pp. 461–480.
- [11] Laurent Younes. “A distance for elastic matching in object recognition”. In: *Comptes rendus de l’Académie des sciences. Série 1, Mathématique* 322.2 (1996), pp. 197–202.
- [12] Laurent Younes. “Representation of Gibbs fields with Synchronous Random Fields.” In: *Markov Processes and Related Fields* 2.2 (1996), pp. 285–316.

- [13] Laurent Younes. “Synchronous Boltzmann machines can be universal approximators”. In: *Applied Mathematics Letters* 9.3 (1996), pp. 109–113.
- [14] Robert Azencott, Jia-Ping Wang, and Laurent Younes. “Texture classification using windowed Fourier filters”. In: *IEEE Transactions on Pattern Analysis & Machine Intelligence* 2 (1997), pp. 148–153.
- [15] Laurent Younes. “Computable elastic distances between shapes”. In: *SIAM Journal on Applied Mathematics* 58.2 (1998), pp. 565–586.
- [16] Laurent Younes. “Synchronous random fields and image restoration”. In: *IEEE Transactions on Pattern Analysis and Machine Intelligence* 20.4 (1998), pp. 380–390.
- [17] Laurent Younes. “On the convergence of Markovian stochastic algorithms with rapidly decreasing ergodicity rates”. In: *Stochastics: An International Journal of Probability and Stochastic Processes* 65.3-4 (1999), pp. 177–228.
- [18] Laurent Younes. “Optimal matching between shapes via elastic deformations”. In: *Image and Vision Computing* 17.5-6 (1999), pp. 381–389.
- [19] Alain Trouvé and Laurent Younes. “On a class of diffeomorphic matching problems in one dimension”. In: *SIAM Journal on Control and Optimization* 39.4 (2000), pp. 1112–1135.
- [20] Michael I. Miller and Laurent Younes. “Group actions, homeomorphisms, and matching: A general framework”. In: *International Journal of Computer Vision* 41.1-2 (2001), pp. 61–84.
- [21] Michael I Miller, Alain Trouvé, and Laurent Younes. “On the metrics and Euler-Lagrange equations of computational anatomy”. In: *Annual review of biomedical engineering* 4.1 (2002), pp. 375–405.
- [22] Alain Trouvé and Laurent Younes. “Mise en correspondance d’objets déformables”. In: *TS. Traitement du signal* 20.3 (2003), pp. 295–302.
- [23] M Faisal Beg, Can Ceritoglu, Anthony E Kolasny, Carey E Priebe, J Tilak Ratnanather, Rob Yashinski, Laurent Younes, Peng Yu, Jorge Jovicich, Randy L Buckner, and Bruce Rosen. “Biomedical Informatics Research Network: Multi-Site Processing Pipeline for Shape Analysis of Brain Structures”. In: *Neuroimage* 22 (2004).
- [24] Darryl D Holm, J Tilak Ratnanather, Alain Trouvé, and Laurent Younes. “Soliton dynamics in computational anatomy”. In: *NeuroImage* 23 (2004), S170–S178.
- [25] Marc Vaillant, Michael I Miller, Laurent Younes, and Alain Trouvé. “Statistics on diffeomorphisms via tangent space representations”. In: *NeuroImage* 23 (2004), S161–S169.
- [26] M Faisal Beg, Michael I Miller, Alain Trouvé, and Laurent Younes. “Computing large deformation metric mappings via geodesic flows of diffeomorphisms”. In: *International journal of computer vision* 61.2 (2005), pp. 139–157.
- [27] Dmitri Bitouk, Michael I Miller, and Laurent Younes. “Clutter invariant ATR”. In: *IEEE transactions on pattern analysis and machine intelligence* 27.5 (2005), pp. 817–821.
- [28] Yan Cao, Michael I Miller, Raimond L Winslow, and Laurent Younes. “Large deformation diffeomorphic metric mapping of vector fields”. In: *IEEE transactions on medical imaging* 24.9 (2005), pp. 1216–1230.

- [29] Patrick A Helm, Hsiang-Jer Tseng, Laurent Younes, Elliot R McVeigh, and Raimond L Winslow. “Ex vivo 3D diffusion tensor imaging and quantification of cardiac laminar structure”. In: *Magnetic Resonance in Medicine: An Official Journal of the International Society for Magnetic Resonance in Medicine* 54.4 (2005), pp. 850–859.
- [30] Alain Trouvé and Laurent Younes. “Local geometry of deformable templates”. In: *SIAM Journal in Mathematical Analysis* 37.1 (2005), pp. 17–59.
- [31] Alain Trouvé and Laurent Younes. “Metamorphoses through lie group action”. In: *Foundations of Computational Mathematics* 5.2 (2005), pp. 173–198.
- [32] Thomas Feldman and Laurent Younes. “Homeostatic image perception: An artificial system”. In: *Computer Vision and Image Understanding* 102.1 (2006), pp. 70–80.
- [33] Laurent Garcin and Laurent Younes. “Geodesic matching with free extremities”. In: *Journal of Mathematical Imaging and Vision* 25.3 (2006), pp. 329–340.
- [34] Patrick A Helm, Laurent Younes, Mirza F Beg, Daniel B Ennis, Christophe Leclercq, Owen P Faris, Elliot McVeigh, David Kass, Michael I Miller, and Raimond L Winslow. “Evidence of structural remodeling in the dyssynchronous failing heart”. In: *Circulation research* 98.1 (2006), pp. 125–132.
- [35] Michael I Miller, Alain Trouvé, and Laurent Younes. “Geodesic shooting for computational anatomy”. In: *Journal of mathematical imaging and vision* 24.2 (2006), pp. 209–228.
- [36] Laurent Younes. “Combining geodesic interpolating splines and affine transformations”. In: *IEEE Transactions on Image Processing* 15.5 (2006), pp. 1111–1119.
- [37] Sébastien Gadat and Laurent Younes. “A stochastic algorithm for feature selection in pattern recognition”. In: *Journal of Machine Learning Research* 8.Mar (2007), pp. 509–547.
- [38] Anqi Qiu, Laurent Younes, Lei Wang, J Tilak Ratnanather, Sarah K Gillepsie, Gillian Kaplan, John Csernansky, and Michael I Miller. “Combining anatomical manifold information via diffeomorphic metric mappings for studying cortical thinning of the cingulate gyrus in schizophrenia”. In: *Neuroimage* 37.3 (2007), pp. 821–833.
- [39] Lei Wang, Faisal Beg, Tilak Ratnanather, Can Ceritoglu, Laurent Younes, John C Morris, John G Csernansky, and Michael I Miller. “Large deformation diffeomorphism and momentum based hippocampal shape discrimination in dementia of the Alzheimer type”. In: *IEEE transactions on medical imaging* 26.4 (2007), pp. 462–470.
- [40] Laurent Younes. “Jacobi fields in groups of diffeomorphisms and applications”. In: *Quarterly of applied mathematics* (2007), pp. 113–134.
- [41] Joan Glaunès, Anqi Qiu, Michael I Miller, and Laurent Younes. “Large deformation diffeomorphic metric curve mapping”. In: *International journal of computer vision* 80.3 (2008), p. 317.
- [42] Hao Huang, Akria Yamamoto, Mir Ahamed Hossain, Laurent Younes, and Susumu Mori. “Quantitative cortical mapping of fractional anisotropy in developing rat brains”. In: *Journal of Neuroscience* 28.6 (2008), pp. 1427–1433.
- [43] Jun Ma, Michael I Miller, Alain Trouvé, and Laurent Younes. “Bayesian template estimation in computational anatomy”. In: *NeuroImage* 42.1 (2008), pp. 252–261.

- [44] Anqi Qiu, Laurent Younes, and Michael I Miller. “Intrinsic and extrinsic analysis in computational anatomy”. In: *Neuroimage* 39.4 (2008), pp. 1803–1814.
- [45] Anqi Qiu, Laurent Younes, Michael I Miller, and John G Csernansky. “Parallel transport in diffeomorphisms distinguishes the time-dependent pattern of hippocampal surface deformation due to healthy aging and the dementia of the Alzheimer’s type”. In: *NeuroImage* 40.1 (2008), pp. 68–76.
- [46] Laurent Younes. “Mathematical Image Analysis AMS493”. In: (2008).
- [47] Laurent Younes, Peter W Michor, Jayant Shah, and David Mumford. “A metric on shape space with explicit geodesics”. In: *Rend. Lincei Math. Appli*, 19 (2008), pp. 25–57.
- [48] Laurent Younes, Anqi Qiu, Raimond L Winslow, and Michael I Miller. “Transport of relational structures in groups of diffeomorphisms”. In: *Journal of mathematical imaging and vision* 32.1 (2008), pp. 41–56.
- [49] Sirong Zhang, Laurent Younes, John Zweck, and J Tilak Ratnanather. “Diffeomorphic surface flows: a novel method of surface evolution”. In: *SIAM Journal on Applied Mathematics* 68.3 (2008), pp. 806–824.
- [50] Siamak Ardekani, Robert G Weiss, Albert C Lardo, Richard T George, Joao AC Lima, Katherine C Wu, Michael I Miller, Raimond L Winslow, and Laurent Younes. “Computational method for identifying and quantifying shape features of human left ventricular remodeling”. In: *Annals of biomedical engineering* 37.6 (2009), pp. 1043–1054.
- [51] Can Ceritoglu, Kenichi Oishi, Xin Li, Ming-Chung Chou, Laurent Younes, Marilyn Albert, Constantine Lyketsos, Peter CM van Zijl, Michael I Miller, and Susumu Mori. “Multi-contrast large deformation diffeomorphic metric mapping for diffusion tensor imaging”. In: *Neuroimage* 47.2 (2009), pp. 618–627.
- [52] Hsiao-Fang Chou and Laurent Younes. “Smoothing directional vector fields using dual norms”. In: *SIAM Journal on Imaging Sciences* 2.1 (2009), pp. 41–63.
- [53] Darryl D Holm, Alain Trouvé, and Laurent Younes. “The Euler-Poincaré theory of metamorphosis”. In: *Quarterly of Applied Mathematics* 67.4 (2009), pp. 661–685.
- [54] Anqi Qiu, Marilyn Albert, Constantine Lyketsos, Laurent Younes, and Michael I Miller. “Diffeomorphic Mapping of Longitudinal Anatomical Shapes”. In: *Neuroimage* 47.1 (2009), S174.
- [55] Anqi Qiu, Marilyn Albert, Laurent Younes, and Michael I Miller. “Time sequence diffeomorphic metric mapping and parallel transport track time-dependent shape changes”. In: *NeuroImage* 45.1 (2009), S51–S60.
- [56] Anqi Qiu, Lei Wang, Laurent Younes, Michael P Harms, J Tilak Ratnanather, Michael I Miller, and John G Csernansky. “Neuroanatomical asymmetry patterns in individuals with schizophrenia and their non-psychotic siblings”. In: *Neuroimage* 47.4 (2009), pp. 1221–1229.
- [57] Laurent Younes, Felipe Arrate, and Michael I Miller. “Evolutions equations in computational anatomy”. In: *NeuroImage* 45.1 (2009), S40–S50.

- [58] Weihong Zhang, Xin Li, Jiangyang Zhang, Andreas Luft, Daniel F Hanley, Peter van Zijl, Michael I Miller, Laurent Younes, and Susumu Mori. “Landmark-referenced voxel-based analysis of diffusion tensor images of the brainstem white matter tracts: application in patients with middle cerebral artery stroke”. In: *Neuroimage* 44.3 (2009), pp. 906–913.
- [59] Rachid Ziane and Laurent Younes. “Conception d’un programme informatique de redressement d’images télévisuelles grand public. Une étape préalable à l’étude cinématique d’actions de jeux sportifs collectifs”. In: *Movement Sport Sciences* 1 (2009), pp. 71–83.
- [60] Felipe Arrate, J Tilak Ratnanather, and Laurent Younes. “Diffeomorphic active contours”. In: *SIAM journal on imaging sciences* 3.2 (2010), pp. 176–198.
- [61] Jun Ma, Michael I Miller, and Laurent Younes. “A bayesian generative model for surface template estimation”. In: *Journal of Biomedical Imaging* 2010 (2010), p. 16.
- [62] Michael Bowers and Laurent Younes. “Laplace Beltrami Filter on QuadEdge Meshes”. In: *The insight journal* 2011 (2011), p. 840.
- [63] Jia Du, Laurent Younes, and Anqi Qiu. “Whole brain diffeomorphic metric mapping via integration of sulcal and gyral curves, cortical surfaces, and images”. In: *NeuroImage* 56.1 (2011), pp. 162–173.
- [64] Kenichi Oishi, Kazi Akhter, Michelle Mielke, Can Ceritoglu, Jiangyang Zhang, Hangyi Jiang, Xin Li, Laurent Younes, Michael I Miller, Peter van Zijl, Marilyn Albert, Constantine G Lyketsos, and Susumu Mori. “Multi-modal MRI analysis with disease-specific spatial filtering: initial testing to predict mild cognitive impairment patients who convert to Alzheimer’s disease”. In: *Frontiers in neurology* 2 (2011), p. 54.
- [65] Anqi Qiu, Laurent Younes, and Michael I Miller. “Principal component based diffeomorphic surface mapping”. In: *IEEE transactions on medical imaging* 31.2 (2011), pp. 302–311.
- [66] Sarah AJ Reading, Kenichi Oishi, Graham W Redgrave, Julie McEntee, Megan Shanahan, Nadine Yoritomo, Laurent Younes, Susumu Mori, Michael I Miller, Peter Van Zijl, Russel L Margolis, and Christopher A Ross. “Diffuse abnormality of low to moderately organized white matter in schizophrenia”. In: *Brain connectivity* 1.6 (2011), pp. 511–519.
- [67] Erdem Yoruk, Michael F Ochs, Donald Geman, and Laurent Younes. “A comprehensive statistical model for cell signaling”. In: *IEEE/ACM Transactions on Computational Biology and Bioinformatics (TCBB)* 8.3 (2011), pp. 592–606.
- [68] Stéphanie Allasonniere and Laurent Younes. “A stochastic algorithm for probabilistic independent component analysis”. In: *The Annals of Applied Statistics* 6.1 (2012), pp. 125–160.
- [69] John Ratnanather, Timothy Brown, Huong Trinh, Laurent Younes, Michael I Miller, Susumu Mori, and Marilyn Albert. “Shape analysis of hippocampus and amygdala in BIOCARD”. In: *Alzheimer’s & Dementia: The Journal of the Alzheimer’s Association* 8.4 (2012), P63.
- [70] Laurent Younes. “Constrained diffeomorphic shape evolution”. In: *Foundations of Computational Mathematics* 12.3 (2012), pp. 295–325.
- [71] Laurent Younes. “Spaces and manifolds of shapes in computer vision: An overview”. In: *Image and Vision Computing* 30.6-7 (2012), pp. 389–397.

- [72] Aastha Jain and Laurent Younes. “A kernel class allowing for fast computations in shape spaces induced by diffeomorphisms”. In: *Journal of Computational and Applied Mathematics* 245 (2013), pp. 162–181.
- [73] Michael I Miller, Laurent Younes, J Tilak Ratnanather, Timothy Brown, Huong Trinh, Elizabeth Postell, David S Lee, Mei-Cheng Wang, Susumu Mori, Richard O’Brien, and Marilyn Albert. “The diffeomorphometry of temporal lobe structures in preclinical Alzheimer’s disease”. In: *NeuroImage: Clinical* 3 (2013), pp. 352–360.
- [74] Michael I Miller, Laurent Younes, John Ratnanather, Timothy Brown, Mei-Cheng Wang, Yi Lu, Shanshan Li, Corinne Pettigrew, Susumu Mori, and Marilyn Albert. “Medial temporal lobe changes preceding symptom onset of mild cognitive impairment: The BIOCARD Cohort”. In: *Alzheimer’s & Dementia: The Journal of the Alzheimer’s Association* 9.4 (2013), P54.
- [75] Casey L Richardson and Laurent Younes. “Computing Metamorphoses Between Discrete Measures”. In: *Journal of Geometric Mechanics* 5.1 (2013), pp. 131–150.
- [76] Francisco Sánchez-Vega, Jason Eisner, Laurent Younes, and Donald Geman. “Learning Multivariate Distributions by Competitive Assembly of Marginals”. In: *IEEE Pattern Analysis Machine Intelligence* 35 (2013), pp. 398–410.
- [77] David M Simcha, Laurent Younes, Martin J Aryee, and Donald Geman. “Identification of direction in gene networks from expression and methylation”. In: *BMC systems biology* 7.1 (2013), p. 118.
- [78] Daniel Tward, Jun Ma, Michael Miller, and Laurent Younes. “Robust Diffeomorphic Mapping via Geodesically Controlled Active Shapes”. In: *International journal of biomedical imaging* 2013 (2013).
- [79] F Vadakkumpadan, L Younes, N Trayanova, and KC Wu. “Image-Based Left Ventricular Shape Analysis for Sudden Cardiac Death Risk Stratification”. In: *Heart Rhythm* 10.11 (2013), p. 1753.
- [80] Sylvain Arguillere, Emmanuel Trélat, Alain Trouvé, and Laurent Younes. “Shape deformation and optimal control”. In: *ESAIM: Proceedings and Surveys* 45 (2014), pp. 300–307.
- [81] Michael I Miller, Laurent Younes, and Alain Trouvé. “Diffeomorphometry and geodesic positioning systems for human anatomy”. In: *Technology* 2.01 (2014), pp. 36–43.
- [82] Allison M Murawski, Saumya Gurbani, Jamie S Harper, Mariah Klunk, Laurent Younes, Sanjay K Jain, and Bruno M Jedynek. “Imaging the evolution of reactivation pulmonary tuberculosis in mice using 18F-FDG PET”. In: *Journal of Nuclear Medicine* 55.10 (2014), pp. 1726–1729.
- [83] Frieda van den Noort, Andreia Faria, Tilak Ratnanather, Christopher Ross, Susumu Mori, Laurent Younes, and Michael Miller. “Anatomical connectivity in prodromal Huntington Disease”. In: *F1000Research* 5 (2014).
- [84] Valentina Staneva and Laurent Younes. “Modeling and estimation of shape deformation for topology-preserving object tracking”. In: *SIAM Journal on Imaging Sciences* 7.1 (2014), pp. 427–455.



- [85] Xiaoying Tang, Dominic Holland, Anders M Dale, Laurent Younes, Michael I Miller, and Alzheimer’s Disease Neuroimaging Initiative. “Shape abnormalities of subcortical and ventricular structures in mild cognitive impairment and Alzheimer’s disease: detecting, quantifying, and predicting”. In: *Human brain mapping* 35.8 (2014), pp. 3701–3725.
- [86] Laurent Younes. “Gaussian diffeons for surface and image matching within a Lagrangian framework”. In: *Geometry, Imaging and Computing* 1.1 (2014), pp. 141–171.
- [87] Laurent Younes, Marilyn Albert, Michael I Miller, and ”the BIOCARD Research Team”. “Inferring changepoint times of medial temporal lobe morphometric change in preclinical Alzheimer’s disease”. In: *NeuroImage: Clinical* 5 (2014), pp. 178–187.
- [88] Laurent Younes, J Tilak Ratnanather, Timothy Brown, Elizabeth Aylward, Peg Nopoulos, Hans Johnson, Vincent A Magnotta, Jane S Paulsen, Russell L Margolis, Roger L Albin, Michael I Miller, and Christopher A Ross. “Regionally selective atrophy of subcortical structures in prodromal HD as revealed by statistical shape analysis”. In: *Human brain mapping* 35.3 (2014), pp. 792–809.
- [89] Sylvain Arguillere, Emmanuel Trélat, Alain Trouvé, and Laurent Younes. “Shape deformation analysis from the optimal control viewpoint”. In: *Journal de mathématiques pures et appliquées* 104.1 (2015), pp. 139–178.
- [90] Donald Geman, Stuart Geman, Neil Hallonquist, and Laurent Younes. “Visual turing test for computer vision systems”. In: *Proceedings of the National Academy of Sciences* 112.12 (2015), pp. 3618–3623.
- [91] Donald Geman, Michael Ochs, Nathan D Price, Cristian Tomasetti, and Laurent Younes. “An argument for mechanism-based statistical inference in cancer”. In: *Human genetics* 134.5 (2015), pp. 479–495.
- [92] Pamela B Mahon, David S Lee, Huong Trinh, Daniel Tward, Michael I Miller, Laurent Younes, Patrick E Barta, and J Tilak Ratnanather. “Morphometry of the amygdala in schizophrenia and psychotic bipolar disorder”. In: *Schizophrenia research* 164.1-3 (2015), pp. 199–202.
- [93] Michael I Miller, J Tilak Ratnanather, Daniel J Tward, Timothy Brown, David S Lee, Michael Ketcha, Kanami Mori, Mei-Cheng Wang, Susumu Mori, Marilyn S Albert, Laurent Younes, and ”the BIOCARD Research Team”. “Network neurodegeneration in Alzheimer’s disease via MRI based shape diffeomorphometry and high-field atlasing”. In: *Frontiers in bioengineering and biotechnology* 3 (2015), p. 54.
- [94] Michael I Miller, Alain Trouvé, and Laurent Younes. “Hamiltonian systems and optimal control in computational anatomy: 100 years since D’Arcy Thompson”. In: *Annual review of biomedical engineering* 17 (2015), pp. 447–509.
- [95] Michael I Miller, Laurent Younes, J Tilak Ratnanather, Timothy Brown, Huong Trinh, David S Lee, Daniel Tward, Pamela B Mahon, Susumu Mori, Marilyn Albert, and ”The BIOCARD Research Team”. “Amygdalar atrophy in symptomatic Alzheimer’s disease based on diffeomorphometry: the BIOCARD cohort”. In: *Neurobiology of aging* 36 (2015), S3–S10.

- [96] Anja Soldan, Corinne Pettigrew, Yi Lu, Mei-Cheng Wang, Ola Selnes, Marilyn Albert, Timothy Brown, J Tilak Ratnanather, Laurent Younes, Michael I Miller, and "the BIOCARD Research Team". "Relationship of medial temporal lobe atrophy, APOE genotype, and cognitive reserve in preclinical Alzheimer's disease". In: *Human brain mapping* 36.7 (2015), pp. 2826–2841.
- [97] Xiaoying Tang, Dominic Holland, Anders M Dale, Laurent Younes, Michael I Miller, and "the Alzheimer's Disease Neuroimaging Initiative". "Baseline shape diffeomorphometry patterns of subcortical and ventricular structures in predicting conversion of mild cognitive impairment to Alzheimer's disease". In: *Journal of Alzheimer's Disease* 44.2 (2015), pp. 599–611.
- [98] Xiaoying Tang, Dominic Holland, Anders M Dale, Laurent Younes, Michael I Miller, and Alzheimer's Disease Neuroimaging Initiative. "The diffeomorphometry of regional shape change rates and its relevance to cognitive deterioration in mild cognitive impairment and Alzheimer's disease". In: *Human brain mapping* 36.6 (2015), pp. 2093–2117.
- [99] Vijay Vedula, Richard George, Laurent Younes, and Rajat Mittal. "Hemodynamics in the left atrium and its effect on ventricular flow patterns". In: *Journal of biomechanical engineering* 137.11 (2015), p. 111003.
- [100] Siamak Ardekani, Saurabh Jain, Alianna Sanzi, Celia P Corona-Villalobos, Theodore P Abraham, M Roselle Abraham, Stefan L Zimmerman, Katherine C Wu, Raimond L Winslow, Michael I Miller, and Laurent Younes. "Shape analysis of hypertrophic and hypertensive heart disease using MRI-based 3D surface models of left ventricular geometry". In: *Medical image analysis* 29 (2016), pp. 12–23.
- [101] Sylvain Arguillere, Michael I Miller, and Laurent Younes. "Diffeomorphic surface registration with atrophy constraints". In: *SIAM Journal on Imaging Sciences* 9.3 (2016), pp. 975–1003.
- [102] Sylvain Arguillere, Emmanuel Trélat, Alain Trouvé, and Laurent Younes. "Registration of multiple shapes using constrained optimal control". In: *SIAM Journal on Imaging Sciences* 9.1 (2016), pp. 344–385.
- [103] Andreia V Faria, J Tilak Ratnanather, Daniel J Tward, David Soobin Lee, Frieda van den Noort, Dan Wu, Timothy Brown, Hans Johnson, Jane S Paulsen, Christopher A Ross, Laurent Younes, Michael Miller, "PREDICT-HD Investigators, and Coordinators of the Huntington Study Group". "Linking white matter and deep gray matter alterations in premanifest Huntington disease". In: *NeuroImage: Clinical* 11 (2016), pp. 450–460.
- [104] Rajat Mittal, Jung Hee Seo, Vijay Vedula, Young J Choi, Hang Liu, H Howie Huang, Saurabh Jain, Laurent Younes, Theodore Abraham, and Richard T George. "Computational modeling of cardiac hemodynamics: Current status and future outlook". In: *Journal of Computational Physics* 305 (2016), pp. 1065–1082.
- [105] Casey L Richardson and Laurent Younes. "Metamorphosis of images in reproducing kernel Hilbert spaces". In: *Advances in Computational Mathematics* 42.3 (2016), pp. 573–603.
- [106] Daniel Tward, Michael Miller, Alain Trouve, and Laurent Younes. "Parametric surface diffeomorphometry for low dimensional embeddings of dense segmentations and imagery". In: *IEEE transactions on pattern analysis and machine intelligence* 39.6 (2016), pp. 1195–1208.

- [107] Benjamin Dirlikov, Laurent Younes, Mary Beth Nebel, Mary Katherine Martinelli, Alyssa Nicole Tiedemann, Carolyn A Koch, Diana Fiorilli, Amy J Bastian, Martha Bridge Denckla, Michael I Miller, and Stewart H Mostofsky. “Novel automated morphometric and kinematic handwriting assessment: A validity study in children with ASD and ADHD”. In: *Journal of Occupational Therapy, Schools, & Early Intervention* 10.2 (2017), pp. 185–201.
- [108] Ehsan Jahangiri, Erdem Yoruk, René Vidal, Laurent Younes, and Donald Geman. “Information pursuit: A bayesian framework for sequential scene parsing”. In: *arXiv preprint arXiv:1701.02343* (2017).
- [109] Xiaoying Tang, Michael I Miller, and Laurent Younes. “Biomarker change-point estimation with right censoring in longitudinal studies”. In: *The annals of applied statistics* 11.3 (2017), p. 1738.
- [110] Dan Wu, Andreia V Faria, Laurent Younes, Susumu Mori, Timothy Brown, Hans Johnson, Jane S Paulsen, Christopher A Ross, Michael I Miller, PREDICT-HD Investigators, and Coordinators of the Huntington Study Group. “Mapping the order and pattern of brain structural MRI changes using change-point analysis in premanifest Huntington’s disease”. In: *Human brain mapping* 38.10 (2017), pp. 5035–5050.
- [111] Wikum Dinalankara, Qian Ke, Yiran Xu, Lanlan Ji, Nicole Pagane, Anching Lien, Tejasvi Matam, Elana J Fertig, Nathan D Price, Laurent Younes, Luigi Marchionni, and Donald Geman. “Digitizing omics profiles by divergence from a baseline”. In: *Proceedings of the National Academy of Sciences* 115.18 (2018), pp. 4545–4552.
- [112] Michael I Miller, Sylvain Arguillère, Daniel J Tward, and Laurent Younes. “Computational anatomy and diffeomorphometry: A dynamical systems model of neuroanatomy in the soft condensed matter continuum”. In: *Wiley Interdisciplinary Reviews: Systems Biology and Medicine* 10.6 (2018), e1425.
- [113] Dan Wu, Andreia V Faria, Laurent Younes, Christopher A Ross, Susumu Mori, and Michael I Miller. “Whole-brain Segmentation and Change-point Analysis of Anatomical Brain MRI—Application in Premanifest Huntington’s Disease”. In: *JoVE (Journal of Visualized Experiments)* 136 (2018), e57256.
- [114] Laurent Younes. “Hybrid Riemannian metrics for diffeomorphic shape registration”. In: *Annals of Mathematical Sciences and Applications* 3.1 (2018).
- [115] Dai-Ni Hsieh and Laurent Younes. “Piecewise Rigid Motion in Diffeomorphism Groups with Strong Right-Invariant Metrics”. In: *Mathematics Of Shapes And Applications* 37 (2019), p. 97.
- [116] Sue Kulason, Daniel J Tward, Timothy Brown, Chelsea S Sicat, Chin-Fu Liu, J Tilak Ratnanather, Laurent Younes, Arnold Bakker, Michela Gallagher, Marilyn Albert, and ”for the Alzheimer’s Disease Neuroimaging Initiative” Miller Michael I. “Cortical thickness atrophy in the transentorhinal cortex in mild cognitive impairment”. In: *NeuroImage: Clinical* 21 (2019), p. 101617.
- [117] Kamel Lahouel, Donald Geman, and Laurent Younes. “Coarse-to-fine multiple testing strategies”. In: *Electronic Journal of Statistics* 13.1 (2019), pp. 1292–1328.

- [118] Xiaoying Tang, Christopher A Ross, Hans Johnson, Jane S Paulsen, Laurent Younes, Roger L Albin, J Tilak Ratnanather, and Michael I Miller. “Regional subcortical shape analysis in premanifest Huntington’s disease”. In: *Human brain mapping* 40.5 (2019), pp. 1419–1433.
- [119] Laurent Younes, Marilyn Albert, Abhay Moghekar, Anja Soldan, Corinne Pettigrew, and Michael Miller. “Identifying Changepoints in Biomarkers During the Preclinical Phase of AD”. In: *Frontiers in aging neuroscience* (2019), p. 508820.
- [120] S Bryn Dhir, Kwame S Kutten, Muwei Li, Andreia V Faria, Laurent Younes, and J Tilak Ratnanather. “Visualising the topography of the acoustic radiation in clinical diffusion tensor imaging scans”. In: *Neuroradiology* 62.9 (2020), pp. 1157–1167.
- [121] Sue Kulason, Eileen Xu, Daniel J Tward, Arnold Bakker, Marilyn Albert, Laurent Younes, and Michael I Miller. “Entorhinal and transentorhinal atrophy in preclinical Alzheimer’s disease”. In: *Frontiers in Neuroscience* 14 (2020), p. 804.
- [122] Kamel Lahouel, Laurent Younes, Ludmila Danilova, Francis M. Giardiello, Ralph H. Hruban, John Groopman, Kenneth W. Kinzler, Bert Vogelstein, Donald Geman, and Cristian Tomasetti. “Revisiting the tumorigenesis timeline with a data-driven generative model”. In: *Proceedings of the National Academy of Sciences* 117.2 (2020), pp. 857–864. ISSN: 0027-8424.
- [123] Laurent Younes. “Diffeomorphic Learning”. In: *Journal of Machine Learning Research* 21.220 (2020), pp. 1–28. URL: <http://jmlr.org/papers/v21/18-415.html>.
- [124] Dai-Ni Hsieh, Sylvain Arguillère, Nicolas Charon, and Laurent Younes. “Diffeomorphic shape evolution coupled with a reaction-diffusion PDE on a growth potential”. In: *Quart. Appl. Math.* 80 (2021), pp. 23–52.
- [125] Qian Ke, Wikum Dinalankara, Laurent Younes, Donald Geman, and Luigi Marchionni. “Efficient representations of tumor diversity with paired DNA-RNA aberrations”. In: *PLoS computational biology* 17.6 (2021), e1008944.
- [126] Dai-Ni Hsieh, Sylvain Arguillère, Nicolas Charon, and Laurent Younes. “Mechanistic Modeling of Longitudinal Shape Changes: equations of motion and inverse problems”. In: *SIAM Journal on Applied Dynamical Systems* 21.1 (2022), pp. 80–101.
- [127] Vittorio Loprinzio and Laurent Younes. “A generative neural network model for random dot product graphs”. In: *arXiv preprint arXiv:2204.07634* (2022).
- [128] Kun Yang, Koko Ishizuka, Andrew P Lane, Zui Narita, Yukiko Y Lema, Toshifumi Tomoda, Atsushi Kamiya, Minghong Ma, Donald Geman, Laurent Younes, and Akira Sawa. “Human olfactory neuronal cells through nasal biopsy: molecular characterization and utility in brain science”. In: *bioRxiv* (2022), pp. 2022–09.
- [129] Thomas L Athey, Daniel J Tward, Ulrich Mueller, Laurent Younes, Joshua T Vogelstein, and Michael I Miller. “Preserving Derivative Information while Transforming Neuronal Curves”. In: *Neuroinformatics* (2023), pp. 1–12.

- [130] Nicolas Charon and Laurent Younes. “Shape spaces: From geometry to biological plausibility”. In: *Handbook of Mathematical Models and Algorithms in Computer Vision and Imaging: Mathematical Imaging and Vision* (2023), pp. 1929–1958.
- [131] Beini Hu, Laurent Younes, Xuan Bu, Chin-Fu Liu, J Tilak Ratnanather, Jane Paulsen, Nellie Georgiou-Karistianis, Michael I Miller, Christopher Ross, and Andreia V Faria. “Mixed longitudinal and cross-sectional analyses of deep gray matter and white matter using diffusion weighted images in premanifest and manifest Huntington’s disease”. In: *NeuroImage: Clinical* 39 (2023), p. 103493.
- [132] Lanlan Ji, An Wang, Shreyash Sonthalia, Daniel Q Naiman, Laurent Younes, Carlo Colantuoni, and Donald Geman. “CellCover Defines Conserved Cell Types and Temporal Progression in scRNA-seq Data across Mammalian Neocortical Development”. In: *bioRxiv* (2023), pp. 2023–04.
- [133] Chin-Fu Liu, Laurent Younes, Xiao J Tong, Jared T Hinkle, Maggie Wang, Sanika Phatak, Xin Xu, Xuan Bu, Vivian Looi, Jee Bang, et al. “Longitudinal imaging highlights preferential basal ganglia circuit atrophy in Huntington’s disease”. In: *Brain communications* 5.5 (2023), fcad214.
- [134] Michele Lohr and Laurent Younes. “FineMorphs: Affine-diffeomorphic sequences for regression”. In: *arXiv preprint arXiv:2305.17255* (2023).
- [135] Mohamed Omar, Wikum Dinalankara, Lotte Mulder, Tendai Coady, Claudio Zanettini, Eddie Luidy Imada, Laurent Younes, Donald Geman, and Luigi Marchionni. “Using Biological Constraints to Improve Prediction in Precision Oncology”. In: *iScience* 26.3 (2023), p. 106108. ISSN: 2589-0042.
- [136] Kaitlin M Stouffer, Alain Trouve, Laurent Younes, Michael Kunst, Lydia Ng, Hongkui Zeng, Manjari Anant, Jean Fan, Yongsoo Kim, and Michael I Miller. “A Universal Method for Crossing Molecular and Atlas Modalities using Simplex-Based Image Varifolds and Quadratic Programming”. In: *bioRxiv* (2023), pp. 2023–03.
- [137] Min Wang, Peter B Barker, Nicola G Cascella, Jennifer M Coughlin, Gerald Nestadt, Frederick C Nucifora Jr, Thomas W Sedlak, Alexandra Kelly, Laurent Younes, Donald Geman, Lena Palaniyappan, Akira Sawa, and Kun Yang. “Longitudinal changes in brain metabolites in healthy controls and patients with first episode psychosis: A 7-Tesla MRS study”. In: *Molecular psychiatry* (2023), pp. 1–12.
- [138] Michael I Miller, Alain Trouvé, and Laurent Younes. “Space-feature measures on meshes for mapping spatial transcriptomics”. In: *Medical Image Analysis* 93 (2024), p. 103068.
- [139] Laurent Younes, Kwame S Kутten, and J Tilak Ratnanather. “Normal and equivolumetric coordinate systems for cortical areas”. In: *MethodsX* (2024), p. 102689.

### *Conference papers*

- [1] Laurent Younes. “Estimation and annealing for Gibbsian fields”. In: *Annales de l’IHP Probabilités et statistiques*. Vol. 24. 2. 1988, pp. 269–294.
- [2] Laurent Younes. “Problèmes d’estimation paramétrique pour des champs de Gibbs Markoviens: applications au traitement d’images”. PhD thesis. Paris 11, 1988.

- [3] Laurent Younes. “Parameter estimation for imperfectly observed gibbs fields and some comments on chalmond’s em gibbsian algorithm”. In: *Stochastic Models, Statistical Methods, and Algorithms in Image Analysis*. Springer, New York, NY, 1992, pp. 240–258.
- [4] Laurent Younes. “Learning algorithms for extended models of Boltzmann machines”. In: *Proceedings of the 12th IAPR International Conference on Pattern Recognition, Vol. 3-Conference C: Signal Processing (Cat. No. 94CH3440-5)*. Vol. 2. IEEE. 1994, pp. 602–604.
- [5] Laurent Younes. “Synchronous image restoration”. In: *European Conference on Computer Vision*. Springer, Berlin, Heidelberg. 1994, pp. 213–217.
- [6] Robert Azencott, François Coldefy, and Laurent Younes. “A distance for elastic matching in object recognition”. In: *Proceedings of 13th International Conference on Pattern Recognition*. Vol. 1. IEEE. 1996, pp. 687–691.
- [7] Robert Azencott and Laurent Younes. “An energy minimization method for matching and comparing structured object representations”. In: *International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition*. Springer, Berlin, Heidelberg. 1997, pp. 441–456.
- [8] Dominique Béréziat, Isabelle Herlin, and Laurent Younes. “Méthodes de détection de mouvement adaptées aux images météorologiques”. In: *16° Colloque sur le traitement du signal et des images, FRA, 1997*. GRETSI, Groupe d’Etudes du Traitement du Signal et des Images. 1997.
- [9] Dominique Berezziat, Isabelle L Herlin, and Laurent Younes. “Motion detection in meteorological images sequences: Two methods and their comparison”. In: *Image Processing, Signal Processing, and Synthetic Aperture Radar for Remote Sensing*. Vol. 3217. International Society for Optics and Photonics. 1997, pp. 332–341.
- [10] Laurent Younes. “Stochastic gradient estimation strategies for Markov random fields”. In: *Bayesian inference for inverse problems*. Vol. 3459. International Society for Optics and Photonics. 1998, pp. 315–325.
- [11] Dominique Béréziat, Isabelle Herlin, and Laurent Younes. “Motion estimation using a volume conservation hypothesis”. In: *1999 IEEE International Conference on Acoustics, Speech, and Signal Processing. Proceedings. ICASSP99 (Cat. No. 99CH36258)*. Vol. 6. IEEE. 1999, pp. 3385–3388.
- [12] Dominique Béréziat, Isabelle Herlin, and Laurent Younes. “A generalized optical flow constraint and its physical interpretation”. In: *Proceedings IEEE Conference on Computer Vision and Pattern Recognition. CVPR 2000 (Cat. No. PR00662)*. Vol. 2. IEEE. 2000, pp. 487–492.
- [13] Alain Trouvé and Laurent Younes. “Diffeomorphic matching problems in one dimension: Designing and minimizing matching functionals”. In: *European Conference on Computer Vision*. Springer, Berlin, Heidelberg. 2000, pp. 573–587.
- [14] Laurent Younes. “Calibrating parameters of cost functionals”. In: *European Conference on Computer Vision*. Springer, Berlin, Heidelberg. 2000, pp. 212–223.

- [15] Vincent Camion and Laurent Younes. “Geodesic interpolating splines”. In: *International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition*. Springer, Berlin, Heidelberg. 2001, pp. 513–527.
- [16] MF Beg, MI Miller, A Trouve, and L Younes. “Computing metrics on anatomical shapes in computational anatomy”. In: *Proceedings of the Second Joint 24th Annual Conference and the Annual Fall Meeting of the Biomedical Engineering Society][Engineering in Medicine and Biology*. Vol. 2. IEEE. 2002, pp. 989–990.
- [17] Mirza Faisal Beg, Michael I Miller, Alain Trouvé, and Laurent Younes. “Computational anatomy: Computing metrics on anatomical shapes”. In: *Proceedings IEEE International Symposium on Biomedical Imaging*. IEEE. 2002, pp. 341–344.
- [18] D Bitouk, MI Miller, and L Younes. “Empirically generated metric spaces for ATR in clutter”. In: *Conference Record of the Thirty-Sixth Asilomar Conference on Signals, Systems and Computers, 2002*. Vol. 2. IEEE. 2002, pp. 1407–1410.
- [19] Mirza Faisal Beg, Michael Miller, Alain Trouvé, and Laurent Younes. “The Euler-Lagrange equation for interpolating sequence of landmark datasets”. In: *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer, Berlin, Heidelberg. 2003, pp. 918–925.
- [20] Dmitri Bitouk, Michael I Miller, and Laurent Younes. “Asymptotic performance analysis for object recognition in clutter”. In: *Automatic Target Recognition XIII*. Vol. 5094. International Society for Optics and Photonics. 2003, pp. 101–108.
- [21] Michael I Miller, Alain Trouvé, and Laurent Younes. “The metric spaces, Euler equations, and normal geodesic image motions of computational anatomy”. In: *Proceedings 2003 International Conference on Image Processing (Cat. No. 03CH37429)*. Vol. 2. IEEE. 2003, pp. II–635.
- [22] Marc Vaillant, Michael I. Miller, Laurent Younes, and Can Ceritoglu. “Initial Value Diffeomorphic Landmark Matching and Its Application to Shape Statistics”. In: *Proceedings of the IEEE Signal Processing Workshop on Statistical Signal Processing: September 28-October 1, 2003, St. Louis, MO, USA*. Institute of Electrical & Electronics Engineers. 2003, p. 306.
- [23] Laurent Garcin, Younes Rangarajan Anand, and Laurent Younes. “Non rigid registration of shapes via diffeomorphic point matching and clustering”. In: *ICIP’2004*. IEEE. 2004, pp. 3299–3302.
- [24] Joan Glaunes, Alain Trouvé, and Laurent Younes. “Diffeomorphic matching of distributions: A new approach for unlabelled point-sets and sub-manifolds matching”. In: *Proceedings of the 2004 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2004. CVPR 2004*. Vol. 2. IEEE. 2004, pp. II–II.
- [25] Hongyu Guo, Anand Rangarajan, S Joshi, and Laurent Younes. “Non-rigid registration of shapes via diffeomorphic point matching”. In: *2004 2nd IEEE International Symposium on Biomedical Imaging: Nano to Macro (IEEE Cat No. 04EX821)*. IEEE. 2004, pp. 924–927.
- [26] Hongyu Guo, Anand Rangarajan, Sarang C Joshi, and Laurent Younes. “A new joint clustering and diffeomorphism estimation algorithm for non-rigid shape matching”. In: *2004 Conference on Computer Vision and Pattern Recognition Workshop*. IEEE. 2004, pp. 16–22.

- [27] D Hager Le Lu Gregory and Laurent Younes. “A three tiered approach for articulated object action modeling and recognition”. In: *NIPS’2004*. 2004.
- [28] Stéphanie Allasonnière, Alain Trouvé, and Laurent Younes. “Geodesic shooting and diffeomorphic matching via textured meshes”. In: *International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition*. Springer, Berlin, Heidelberg. 2005, pp. 365–381.
- [29] Yan Cao, Michael I Miller, Raimond L Winslow, and Laurent Younes. “Large deformation diffeomorphic metric mapping of fiber orientations”. In: *Tenth IEEE International Conference on Computer Vision (ICCV’05) Volume 1*. Vol. 2. IEEE. 2005, pp. 1379–1386.
- [30] Sébastien Gadat and Laurent Younes. “Sélection de variables pour la reconnaissance de formes”. In: *20° Colloque sur le traitement du signal et des images, FRA, 2005*. GRETSI, Groupe d’Etudes du Traitement du Signal et des Images. 2005.
- [31] Laurent Garcin and Laurent Younes. “Geodesic image matching: A wavelet based energy minimization scheme”. In: *International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition*. Springer, Berlin, Heidelberg. 2005, pp. 349–364.
- [32] Yan Cao, Michael I Miller, Susumu Mori, Raimond L Winslow, and Laurent Younes. “Diffeomorphic matching of diffusion tensor images”. In: *2006 Conference on Computer Vision and Pattern Recognition Workshop (CVPRW’06)*. IEEE. 2006, pp. 67–67.
- [33] Joan Glaunès, Alain Trouvé, and Laurent Younes. “Modeling planar shape variation via Hamiltonian flows of curves”. In: *Statistics and analysis of shapes*. Birkhäuser Boston, 2006, pp. 335–361.
- [34] Mirza Faisal Beg, Ryan Dickie, Gregory Golds, and Laurent Younes. “Consistent realignment of 3D diffusion tensor MRI eigenvectors”. In: *Medical Imaging 2007: Image Processing*. Vol. 6512. International Society for Optics and Photonics. 2007, p. 651242.
- [35] Anqi Qiu, Laurent Younes, Lei Wang, J Tilak Ratnanather, John G Csernansky, and Michael I Miller. “Cortical Thinning of Cingulate Gyrus in Schizophrenia”. In: *International Congress on Schizophrenia Research, Colorado Springs, CO*. 2007.
- [36] JT Ratnanather, L Younes, J Zweck, L Wang, M Hosakere, JG Csernansky, and MI Miller. “Statistical analysis of surface roughness via local area maps: Application to the cingulate in healthy and schizophrenic subjects”. In: *Schizophrenia Bulletin*. Vol. 33. 2. Oxford Univ Press. 2007, pp. 353–353.
- [37] Siamak Ardekani, Robert G Weiss, Albert C Lardo, Richard T George, Joao AC Lima, Katherine C Wu, Michael I Miller, Raimond L Winslow, and Laurent Younes. “Cardiac motion analysis in ischemic and non-ischemic cardiomyopathy using parallel transport”. In: *2009 IEEE International Symposium on Biomedical Imaging: From Nano to Macro*. IEEE. 2009, pp. 899–902.
- [38] Hsiao-Fang Chou and Laurent Younes. “Smoothing fields of frames using conjugate norms on reproducing kernel Hilbert spaces”. In: *Computational Imaging VII*. Vol. 7246. International Society for Optics and Photonics. 2009, p. 724607.



- [39] Camille Vidal, Joshua Hewitt, Stephanie Davis, Laurent Younes, Sanjay Jain, and Bruno Jedynek. “Template registration with missing parts: Application to the segmentation of M. tuberculosis infected lungs”. In: *2009 IEEE International Symposium on Biomedical Imaging: From Nano to Macro*. IEEE. 2009, pp. 718–721.
- [40] Siamak Ardekani, Aastha Jain, Saurabh Jain, Theodore P Abraham, Maria R Abraham, Stefan Zimmerman, Raimond L Winslow, Michael I Miller, and Laurent Younes. “Matching sparse sets of cardiac image cross-sections using large deformation diffeomorphic metric mapping algorithm”. In: *International Workshop on Statistical Atlases and Computational Models of the Heart*. Springer, Berlin, Heidelberg. 2011, pp. 234–243.
- [41] Alain Trouvé and Laurent Younes. “Shape Spaces”. In: *Handbook of Mathematical Methods in Imaging*. Springer, 2011, pp. 1309–1362.
- [42] Camille Vidal, Dale Beggs, Laurent Younes, Sanjay K Jain, and Bruno Jedynek. “Incorporating user input in template-based segmentation”. In: *2011 IEEE International Symposium on Biomedical Imaging: From Nano to Macro*. IEEE. 2011, pp. 1434–1437.
- [43] Michael I Miller, Laurent Younes, J Tilak Ratnanather, Timothy Brown, Tommy Reigel, Huong Trinh, Xiaoying Tang, Peter Barker, Susumu Mori, and Marilyn Albert. “Amygdala atrophy in MCI/Alzheimer’s disease in the BIOCARD cohort based on diffeomorphic morphometry”. In: *Medical image computing and computer-assisted intervention: MICCAI... International Conference on Medical Image Computing and Computer-Assisted Intervention*. Vol. 2012. NIH Public Access. 2012, p. 155.
- [44] Fijoy Vadakkumpadan, Natalia Trayanova, Laurent Younes, and Katherine C Wu. “Left-ventricular shape analysis for predicting sudden cardiac death risk”. In: *2012 Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. IEEE. 2012, pp. 4067–4070.
- [45] Giann Gorospe, Laurent Younes, Leslie Tung, and René Vidal. “A metamorphosis distance for embryonic cardiac action potential interpolation and classification”. In: *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer, Berlin, Heidelberg. 2013, pp. 469–476.
- [46] Bahman Afsari, Elana Judith Fertig, Laurent Younes, Donald Geman, and Luigi Marchionni. *Hardwiring mechanism into predicting cancer phenotypes by computational learning*. 2014.
- [47] Siamak Ardekani, Geoffrey Gunter, Saurabh Jain, Robert G Weiss, Michael I Miller, and Laurent Younes. “Estimating dense cardiac 3D motion using sparse 2D tagged MRI cross-sections”. In: *2014 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. IEEE. 2014, pp. 5101–5104.
- [48] Ehsan Jahangiri, René Vidal, Laurent Younes, and Donald Geman. “Object-Level Generative Models for 3D Scene Understanding”. In: *SUNw: Scene Understanding Workshop*. 2014.
- [49] Saurabh Jain, Yousef Salimpour, Laurent Younes, Gwenn Smith, Zoltan Mari, Vesna Sossi, and Arman Rahmim. “Application of pattern recognition framework for quantification of Parkinson’s disease in DAT SPECT imaging”. In: *2014 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)*. IEEE. 2014, pp. 1–8.

- [50] Saurabh Jain, Daniel J Tward, David S Lee, Anthony Kolasny, Timothy Brown, J Tilak Ratananather, Michael I Miller, and Laurent Younes. “Computational anatomy gateway: leveraging xsede computational resources for shape analysis”. In: *Proceedings of the 2014 Annual Conference on Extreme Science and Engineering Discovery Environment*. ACM. 2014, p. 54.
- [51] Daniel Tward, Jorge Jovicich, Andrea Soricelli, Giovanni Frisoni, Alain Trouvé, Laurent Younes, and Michael Miller. “Improved reproducibility of neuroanatomical definitions through diffeomorphometry and complexity reduction”. In: *International Workshop on Machine Learning in Medical Imaging*. Springer, Cham. 2014, pp. 223–230.
- [52] Vijay Vedula, Jung-Hee Seo, Kourosh Shoele, Richard George, Laurent Younes, and Rajat Mittal. “Image-based flow modeling in a two-chamber model of the left heart”. In: *APS Division of Fluid Dynamics Meeting Abstracts*. 2014.
- [53] Giann Gorospe, Renjun Zhu, Jia-Qiang He, Leslie Tung, Laurent Younes, and René Vidal. “Efficient metamorphosis computation for classifying embryonic cardiac action potentials”. In: *5th Workshop on Mathematical Foundations of Computational Anatomy*. 2015, pp. 177–218.
- [54] Xiaoying Tang, Marilyn Albert, Michael I Miller, and Laurent Younes. “Change Point Estimation of the Hippocampal Volumes in Alzheimer’s Disease”. In: *2016 13th Conference on Computer and Robot Vision (CRV)*. IEEE. 2016, pp. 358–361.
- [55] Wikum Dinalankara, Qian Qe, Lanlan Ji, Yiran Xu, Nicole Pagane, Francisco Lobo, Laurent Younes, Donald Geman, and Luigi Marchionni. *Divergence analysis with coarse coding of omics data across cancer phenotypes*. 2017.
- [56] Valentina Staneva and Laurent Younes. “Learning Shape Trends: Parameter Estimation in Diffusions on Shape Manifolds”. In: *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops*. 2017, pp. 38–46.
- [57] Dai-Ni Hsieh, Sylvain Arguillère, Nicolas Charon, Michael I Miller, and Laurent Younes. “A Model for Elastic Evolution on Foliated Shapes”. In: *International Conference on Information Processing in Medical Imaging*. Springer, Cham. 2019, pp. 644–655.
- [58] *Mathematics of shapes and applications*. World Scientific, 2019.
- [59] Paul A Yushkevich, Ahmed Aly, Jiancong Wang, Long Xie, Robert C Gorman, Laurent Younes, and Alison M Pouch. “Diffeomorphic Medial Modeling”. In: *International Conference on Information Processing in Medical Imaging*. Springer, Cham. 2019, pp. 208–220.
- [60] Laurent Younes, Barbara Gris, and Alain Trouvé. “Sub-Riemannian Methods in Shape Analysis”. In: *Handbook of Variational Methods for Nonlinear Geometric Data*. Springer, Cham, 2020, pp. 463–495.
- [61] Neil Hallonquist, Donald German, and Laurent Younes. “Graph Discovery for Visual Test Generation”. In: *2020 25th International Conference on Pattern Recognition (ICPR)*. IEEE. 2021, pp. 7500–7507.

- [62] Ke Chen, Carola-Bibiane Schönlieb, Xue-Cheng Tai, and Laurent Younes. *Handbook of mathematical models and algorithms in computer vision and imaging: mathematical imaging and vision*. 2023.
- [63] Ruiyi Zhang, Jinchi Wei, Dnyanesh Tipre, Robert G Weiss, Laurent Younes, and Siamak Ardekani. “Cardiac MRI Tagline Extraction Based on Diffeomorphic Active Contour Algorithm”. In: *International Conference on Functional Imaging and Modeling of the Heart*. Springer Nature Switzerland Cham. 2023, pp. 320–328.

### Invited Talks

- **Departmental Seminars:** *Seminar of the Department of Statistics*, ETH Zentrum, Zurich, 1989; *System Research Center Seminar*, University of Maryland, 1990; *Department of Mathematics Seminar*, University Rome 2, Rome, Italy, 1990; *Department of Mathematics Seminar*, Sun-Yat-Tse University, Taiwan, 1991; *Department of Computer Science*, Brown University, 1999; *Center for Imaging Science Seminar*, Johns Hopkins University, Baltimore, USA, 1999; *Department of Mathematics Seminar*, University of Maryland, Baltimore County, 2004; *University of Pennsylvania*, 2006; *University of Maryland College Park*, 2007; *NIST*, 2007; *North Carolina State University*, 2007; *Invited seminar at NCSU*, 2007. *Department of Mathematics*, Georgetown University, 2007. *University of Pennsylvania*, 2008; *Department of Mathematics*, ETH Zurich, 2009; *Department of Statistics*, University of Chicago, 2009; *Department of Biostatistics*, UNC Chapel Hill, 2012; *Biomedical Research Imaging Center Seminar*, UNC Chapel Hill, 2012; *Department of Biostatistics*, Duke University, 2012; *Department of Probability*, National Taiwan University, 2013; *Simon Frazer University*, Vancouver, 2015; *Department of Mathematics*, Houston University, 2018.
- **Conferences and Workshops:** AMS conference, *Spatial statistics and imaging*, Brunswick, USA, 1988; *Stochastics*, Oberwolfach, Germany, 1990; *Stochastic models and imaging*, Beowulf, Germany, 1990; *Markov random fields and related topics*, Academia Sinica, Taipei, 1991; *Theoretical aspects of neural networks*, Paris, 1992; *Curves, images, massive computation*, Oberwolfach, Germany, 1993; *Numerical probability*, Paris, 1993; *Neuromimetic networks*, Lyon, France, 1994; *Prague Statistical Conference*, Prague, 1994; *International Statistical Institute*, Beijing, China, 1995; *Signal processing*, University of Cergy-Pontoise, France, 1995; *Image analysis workshop of the Centre de Recherches Mathématiques*, Montreal, Canada, 1998; SPIE conference, *Bayesian inference for inverse problems*, San Diego, USA, 1998; *ECCV 2000*, Dublin, Ireland, 2000; Numerical analysis conference, *CANUM 2000*, Port d’Albret, France, 2000; *Institute for Mathematics and its Applications*, Minneapolis, USA, 2000; SEE conference, *Le traitement d’images à l’aube du XXIème siècle*, Paris, 2002; *SIAM conference on imaging*, Boston, USA, 2002; *NPCONF*, Crete, 2002; *Workshop on Mathematical Imaging*, Mittag-Leffler Institute, Stockholm, 2003; *GBM conference*, IPAM, Lake Arrowhead, CA, 2003; *Medical imaging summer school*, IPAM, Los Angeles, CA, 2004; *Workshop on Visual Recognition*, MSRI, Berkeley, CA, 2005; *Statistical Inference on Shape Manifolds*, Palo-Alto, CA, 2005; *The Geometry of Shape Spaces*, IMA, MN, 2006 (co-organizer); *Challenges and Opportunities in Image Understanding*, Washington DC, 2007; *AFOSR workshop*, University of Maryland, 2007; *The Geometry and statistics of shape spaces*, SAMSI, 2007 (co-organizer); *Workshop in honor of*

*D. Holm 65th birthday*, D2Hfest, EPFL Lausanne, 2007; *SIAM conference in imaging*, San Diego, 2008; *IPAM workshop: Mathematics of Brain Imaging*, Los Angeles, 2008; *Workshop on statistics and geometry of shape*, Bonn, 2008; *Workshop on Random Fields and Stochastic Geometry*, Banff, 2009; *ONR workshop*, IMA, 2009; *SAMSI Workshop 2010*; *Oberwolfach Workshop Trends in Mathematical Imaging and Surface Processing*, 2011; *CIRM Workshop Workshop on Geometric Flows*, Luminy 2011; *Dagstuhl workshop Innovations for Shape Analysis: Models and Algorithms*, 2011; *Equadiff Conference*, Loughborough University, UK, 2011; *Newton Institute Workshop Analytic and Geometric Methods in Medical Imaging*, 2011; *Third Tsinghua Sanya International Mathematics Forum conference*, Sanya, China, 2013; *Joint Statistical Meeting*, Montreal, 2013; *ONR Workshop*, IMA, 2013; *14th Annual Winter School in eScience* Geilo, Norway, 2014; *Joint Mathematical Meetings*, Baltimore 2014; *Mathematical Biology Institute workshop: Morphogenesis, Regeneration, and the Analysis of Shape*, Ohio State, 2014; *SIAM Imaging Science Conference*, Hong-Kong, 2014; *Shape Analysis Meeting*, Imperial College, London, June 01, 2014; *SIAM Conference on Computational Science and Engineering*, Salt Lake City, 2015; *Classic and Stochastic Geometric Mechanics*, EPFL, 2015; *Joint Statistical Meetings* Seattle, 2015. *SSIMA Imaging Summer School*, Romania, 2015; *Neuroscience summer school*, SAMSI, 2015; *Joint Statistical Meetings*, Seattle, 2015; *Statistical Analysis of Manifold Data and Beyond*, University of Nottingham, UK., 2016; *Geometric Analysis in Control and Vision Theory*, Voss, Norway, 2016; *SIAM conference in Imaging Science*, Albuquerque, 2016; *ISNPS 2016*, Avignon, France, 2016; *SSIMA 2016*, University of Bucharest, 2016; *Mathematics of Shape and Applications*, University of Singapore, 2016; *Biomedical Imaging and Computer Vision*, University of Singapore, 2016; *New Trends in Applied Geometric Mechanics*, ICMAT, Madrid, 2017; *SIAM conference on Imaging Science*, Pittsburgh, 2017; *Applications-Driven Geometric Functional Data Analysis*, Florida State University, 2017; *Shape analysis and computational anatomy*, Isaac Newton Institute for Mathematics, Cambridge, UK, 2017; *Flows, mappings and shapes*, Isaac Newton Institute for Mathematics, Cambridge, UK, 2017; *Nonlinear Data: Theory and Algorithms*, Mathematics Research Institute Oberwolfach, Germany, 2018; *Elastic Functionals and Shape Data Analysis*, Harvard University; 2018; *Euclidean, Discrete and Algebraic Geometric Methods*, Dagstuhl, Germany, 2018; *Morphometrics, Morphogenesis and Mathematics*, Harvard University, 2018. *Geometry and Statistics in Data Science*, Institute Henri Poincaré, Paris, 2022; *Mathematical Imaging and Surface Processing*, Oberwolfach, 2022; *Mathematical Methods for Exploring and Analyzing Morphological Shapes across Biological Scales*, Banff, 2023; *Joint Mathematics Meetings: Special Session on the Geometry of the Shape Space*, San Francisco, 2024; *Joint Mathematics Meetings: SIAM Session on Model- and Data-Driven Approaches in Motion Analysis*, San Francisco, 2024.

- **Lecture Series and Tutorials:** Tutorial *Image deformation and warping*, *ECCV 2000*; *Amudson Lectures Series*, three lectures, University of Houston, 2011; Tutorial, *SSIMA*, Romania, 2015; *SAMSI*, *Computational Neuro-science*, 2015.

## Extramural Sponsorship

- CNRS grants: Mathematics and Information Theory, 2001 (funding: 8000 euros, P.I.) and 2002

- (funding: 8000 euros, co-investigator), 2004 (funding: 10000 euros, co-investigator).
- Grants for the CNRS Research Group Mathematics for Perceptive and Cognitive Systems: 2001 (funding: 11000 euros, P.I.), 2002 (funding: 11000 euros, P.I.).
- **Co-investigator** : NIH: Conte Center/Mapping Abnormal Neurodevelopment in Schizophrenia, J. Czernansky, P.I. (ended 2009).
- **Co-principal investigator** : NSF: ITR Triage and the Automated Annotation of Large Image Data Sets, D. Geman, P.I. (NCE ending 2010).
- **Principal investigator**: NSF: FRG: The geometry, mechanics and statistics of the infinite-dimensional manifold of shape (ended 2009).
- **Co-investigator**: NIH: Microimaging of Mouse Brain Development, S. Mori, P.I. (ended 2009).
- **Co-investigator**: NIH P41 RR015241-06, The Resource of Quantitative Functional MIR, P. van Zijl, P.I. (ending 2011).
- **Co-principal investigator**: NSF, Small-sample Network Inference in Computational Vision and Biology, D. Geman, P.I. (ending 2010).
- **Co-principal investigator**: NIH, Cardio-Vascular Research Grid, R. Winslow, PI (Awarded, budget unknown) NCBC: The National Center for Computational-Based Medicine, R. Winslow, P.I. (ending 2010).
- **Principal investigator**: ONR, Diffeomorphic Models of Shape Evolution (ending 2010).
- **Co-investigator**: NIH, NCBC: 3D Shape Analysis for Computational Anatomy M. Miller, P.I. (ending 2013).
- **Principal investigator**: NSF, Numerical Computation of Geodesics in the Framework of Metamorphosis (ending 2013).
- **Co-principal Investigator**: NIH, MR Microimaging of Mouse Brain Development, S. Mori, P.I. (ending 2014).
- **Co-principal Investigator**: NSF, RI: Medium: Active Scene Interpretation by Entropy Pursuit, D. Geman, P.I. (ending 2014).
- **Co-principal Investigator**: NIH, Resource for Quantitative Functional MRI: TRD 4, P. van Zijl, P.I. (ending 2014).
- **Co-principal Investigator**: NSF, Coarse-to-fine Testing for Genetic Associations, D. Geman, P.I. (ending 2015).
- **Co-principal Investigator**: DARPA, Hierarchical Representations for the Evaluation of a Sensed Data, S. Geman, P.I. (ending 2015).
- **Principal investigator**: ONR, Constrained Diffeomorphic Shape Evolution (ending 2015).
- **Co-principal Investigator**: NSF, Geometry and Statistics on Spaces of Dynamical Systems for Pattern Recognition in High-Dimensional Time Series R. Vidal, P.I. (ending 2016).

## Teaching

- **Undergraduate courses** in mathematics at University Paris Dauphine, 1986 -1990 (1986–1989: Introduction to statistics, 1990 : *Linear algebra*).
- **Graduate courses** in the DEA (Master’s) program “Statistics and models” at University Paris

Sud, 1991–1995, (1991 and 1992: *Image analysis*, 1993–1995: *Markov random fields*)

- **Graduate course** in the DEA (Master’s) program “Mathematics and artificial intelligence”, ENS de Cachan, 1996–1998, (*Curve deformations and shape recognition*)
- **Graduate courses** in the DEA (Master’s) program “Mathematics, vision, learning”, ENS de Cachan, 1999–2001 (1999: *Statistical image models* , 2000 and 2001: *Information theory*, 2002: *Analysis of deformations*)
- **Undergraduate course** in the Department of Applied Mathematics and Statistics, Johns Hopkins University: *Probability and Statistics for the Biological Sciences and Engineering* (2004-05); Introduction to Statistics (2014-15).
- **Graduate courses** in the Department of Applied Mathematics and Statistics, Johns Hopkins University: *Deformation analysis* (2003–04); *Statistical Inference* (2004-05); *Robust and non-parametric statistics* (2003-04, 2017-18); *Mathematical image analysis* (2004-05, 2006-07, 2008-09) ; *Shape and Differential Geometry* (2005-06, 2007-08, 2014-15, 2022-23); *Machine Learning* (2005-06, 2006-07, 2007-08, 2008-09, 2018-21); *Graphical Models* (2007-08, 2008-09); Mathematical Foundations of Computational Anatomy (2019-20, 2023-24); Optimization in Data Science (2022-23); Introduction to Control Theory (2023-24).