

Bibliography - Prof Thomas Bewley

PROFILE

Prof Bewley founded and directs the Flow Control & Coordinated Robotics Labs at UC San Diego. The Flow Control Lab investigates a range of questions ranging from fundamental to applied, including the development of advanced analysis tools and numerical methods to better understand, optimize, estimate, forecast, and control fluid systems. The Coordinated Robotics Lab investigates the mobility and coordination of low-cost robotic vehicles, leveraging dynamic models and feedback control, with prototypes built using cellphone and IoT technologies, custom PCBs, and 3D printing. The two labs collaborate closely on a variety of interdisciplinary projects, including the deployment of robotic sensor vehicle swarms for both real-time hurricane measurement as well as real-time contaminant plume detection, estimation, & forecasting.

PROFESSIONAL PREPARATION

B.S.	Engineering & Applied Science	Caltech	GPA: 3.9	1989
M.S.	Mechanical Engineering	Caltech	GPA: 3.9	1989
Diploma	Aeronautics/Aerospace	von Karman Institute for Fluid Dynamics	rank: 1/39	1990
Ph.D.	Mechanical Engineering	Stanford	GPA: 4.0	1999

ACADEMIC APPOINTMENTS

Permanent:

Professor	Mechanical & Aerospace Engineering	UC San Diego	July 2009 - present
Affiliate Professor	Computer Science & Engineering	UC San Diego	July 2015 - present
Associate Professor	Mechanical & Aerospace Engineering	UC San Diego	July 2004 - June 2009
Assistant Professor	Mechanical & Aerospace Engineering	UC San Diego	Sep 1998 - June 2004

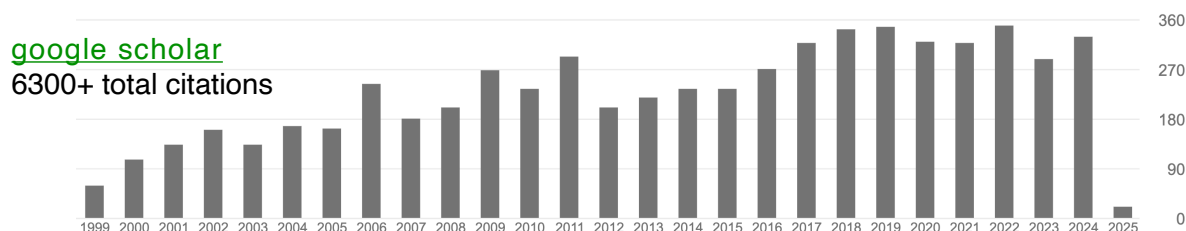
Temporary:

sabbatical with Patrick Huerre	École Polytechnique, Palaiseau, France	fall 1998
CTR Summer Programs with Parviz Moin	CTR, Stanford	summers 1996/98, 2000/02/08
sabbaticals with Paolo Luchini	UNISA, Salerno, Italy	spring 2009 & 2011
Mathematics of Turbulence long program	IPAM, UCLA	fall 2014
Faculty Research Program with Ryan Alimo	JPL, Los Angeles	summer 2019
1.5 month visit with Ali Masheyek	University of Cambridge, UK	late spring 2023
Distinguished Visiting Professor, DFME	United States Air Force Academy (USAF)	AY 2024-2025

AWARDS

Charles Lee Powell Foundation Faculty Fellowship	2000
Hellman Foundation Faculty Fellowship	2002
ONR Young Investigator	2003
UCSD MAE Best Teacher Award	2013
Innovative Toy Of The Year (the WowWee MiP sold millions of units in its different variations)	2015

PUBLICATIONS



Summarized on the pages that follow:

52 published journal articles, **93** published conference papers, and first author on **6** granted US patents. Additionally: links to: **9** submitted manuscripts on recent work, and **1** international (PCT) patent applied for, as summarized briefly at my corresponding [Personal Statement](#).

Bibliography - Prof Thomas Bewley

Published journal articles, with [local](#), [original](#), and some [google scholar](#) hyperlinks

1. Moin, P., & **Bewley, T** (1994) [Feedback control of turbulence](#). *Appl. Mech. Rev.* **47** (6S), S3-S13. ([citations](#))
2. **Bewley, T**, & Liu, S. (1998) [Optimal and robust control and estimation of linear paths to transition](#). *J. Fluid Mech.* **365**, 305-349. ([citations](#))
3. Hammond, E.P., **Bewley, T**, & Moin, P. (1998) [Observed mechanisms for turbulence attenuation and enhancement in opposition-controlled wall-bounded flows](#). *Physics of Fluids* **10**, 2421-2423. ([citations](#))
4. **Bewley, T** (1999) [Linear control and estimation of nonlinear chaotic convection: harnessing the butterfly effect](#). *Physics Of Fluids* **11** (5), 1169-1186. ([citations](#))
5. **Bewley, T**, Temam, R., & Ziane, M. (2000a) [A general framework for robust control in fluid mechanics](#). *Physica D* **138**, 360-392. ([citations](#))
6. **Bewley, T**, Temam, R., & Ziane, M. (2000b) [Existence and uniqueness of optimal control to the Navier-Stokes equations](#). *C.R. Acad. Sci. Paris* **330** (11), 1-5. ([citations](#))
7. **Bewley, T** (2001) [Flow control: new challenges for a new Renaissance](#). *Progress in Aerospace Sciences* **37**, 21-58. ([citations](#))
8. **Bewley, T**, Moin, P., & Temam, R. (2001) [DNS-based predictive control of turbulence: an optimal benchmark for feedback algorithms](#). *J. Fluid Mech.* **447**, 179-225; see also [appendix C](#). ([citations](#))
9. Lauga, E., & **Bewley, T** (2002) [Modern control of linear global instability in a cylinder wake model](#). *International Journal of Heat and Fluid Flow* **23**, 671-677. ([citations](#))
10. Aamo, O.M., Krstic, M., & **Bewley, T** (2003) [Control of mixing by boundary feedback in 2D channel flow](#). *Automatica* **39**, 1597-1606. ([citations](#))
11. Cervino, L.I., & **Bewley, T** (2003) [On the extension of the complex-step derivative technique to pseudospectral algorithms](#). *J. Comp. Phys.* **187**, 544-549. ([citations](#))
12. Hogberg, M., **Bewley, T**, & Henningson, D.S. (2003) [Linear feedback control and estimation of transition in plane channel flow](#). *J. Fluid Mech.* **481**, 149-175. ([citations](#))
13. Hogberg, M., **Bewley, T**, & Henningson, D.S. (2003) [Relaminarization of Re_{tau}=100 turbulence using gain scheduling and linear state-feedback control](#). *Physics Of Fluids* **15**, 3572-3575. ([citations](#))
14. Lauga, E., & **Bewley, T** (2003) [The decay of stabilizability with Reynolds number in a linear model of spatially developing flows](#). *Proc. R. Soc. Lond. A* **459**, 2077-2095. ([citations](#))
15. Lauga, E., & **Bewley, T** (2004) [Performance of a linear robust control strategy on a nonlinear model of spatially-developing flows](#). *J. Fluid Mech.* **512**, 343-374. ([citations](#))
16. Yuan, C.C.L., Krstic, M., & **Bewley, T** (2004) [Active control of jet mixing](#). *IEE Proc.-Control Theory Appl.* **151**, 763-772. ([citations](#))
17. Luo, H., & **Bewley, T** (2004) [On the contravariant form of the Navier-Stokes equation in time-dependent curvilinear coordinate systems](#). *J. Comp. Phys.* **199**, 355-375. ([citations](#))
18. **Bewley, T**, & Protas, B. (2004) [Skin friction and pressure: the "footprints" of turbulence](#). *Physica D* **196**, 28-44. ([citations](#))
19. Protas, B, **Bewley, T**, & Hagen, G. (2004) [A computational framework for the regularization of adjoint analysis in multiscale PDE systems](#). *J. Comp. Phys.* **195** (1), 49-89. ([citations](#))

Bibliography - Prof Thomas Bewley

20. **Bewley, T**, & Aamo, O.M. (2004) [A "win-win" mechanism for low-drag transients in controlled 2D channel flow and its implications for sustained drag reduction](#). *J. Fluid Mech.* **499**, 183-196. ([citations](#))
21. Cathalifaud, P., & **Bewley, T** (2004) [A noncausal framework for model-based feedback control of spatially-developing perturbations in boundary-layer flow systems. Part I: Formulation](#). *Systems and Control Letters* **51** (1), 1-13. ([citations](#))
22. Cathalifaud, P., & **Bewley, T** (2004) [A noncausal framework for model-based feedback control of spatially-developing perturbations in boundary-layer flow systems. Part II: Numerical simulations using state feedback](#). *Systems and Control Letters* **51** (1), 15-22.
23. Hoepffner, J., Chevalier, M., **Bewley, T** & Henningson, D.S. (2005) [State estimation in wall-bounded flow systems. Part 1. Perturbed laminar flows](#). *J. Fluid Mech.* **534**, 263-294. ([citations](#))
24. Chevalier, M., Hoepffner, J., **Bewley, T**, & Henningson, D.S. (2006) [State estimation in wall-bounded flow systems. Part 2. Turbulent flows](#). *J. Fluid Mech.* **552**, 167-187. ([citations](#))
25. **Bewley, T**, & Ziane, M. (2007) [A Fundamental Limit on the Heat Flux in the Control of Incompressible Channel Flow](#). *IEEE Transactions on Automatic Control* **52**, 2118-2128.
26. Kim, J, & **Bewley, T** (2007) [A linear systems approach to flow control](#). *Annual Review of Fluid Mechanics* **39**, 383-417. ([citations](#))
27. **Bewley, T**, Sharma, A.S (2007) [On the convergence of boundary control strategies designed using ODE approximations of diffusive PDE systems](#), *IFAC Proceedings Volumes* **40** (5), 1-18.
28. Bement, M.T., & **Bewley, T** (2008) [Excitation design for damage detection using iterative adjoint based optimization. Part 1 Method Development](#), *Mechanical Systems and Signal Processing* **23**, 783-793.
29. Bement, M.T., & **Bewley, T** (2008) [Excitation design for damage detection using iterative adjoint based optimization. Part 2 Experimental demonstration](#), *Mechanical Systems and Signal Processing* **23**, 794-803.
30. **Bewley, T** (2009) [A fundamental limit on the balance of power in a transpiration-controlled channel flow](#). *J. Fluid Mech.* **632**, 443-446. ([citations](#))
31. Colburn, C., Cessna, J., & **Bewley, T** (2011) [State estimation in wall-bounded flow systems. Part 3: The Ensemble Kalman Filter](#) *J. Fluid Mech* **682**, 289-303. ([citations](#))
32. **Bewley, T**, & Sharma, A.S. (2012) [Efficient grid-based Bayesian estimation of nonlinear low-dimensional systems with sparse non-Gaussian PDFs](#) *Automatica* **48**, 1286-1290.
33. Stipanovic, D.M., Valicka, C., Tomlin, C.J., & **Bewley, T** (2013) [Safe and Reliable Coverage Control](#), *Numerical Algebra, Control and Optimization* **3** (1), 31-48. ([citations](#))
34. Morozovsky, N., Moroto, R., & **Bewley, T** (2013) [RAPID: An Inexpensive Open Source Dynamometer for Robotics Applications](#), *IEEE/ASME Transactions on Mechatronics*, **18** (6), 1855-1860.
35. Belitz, P., & **Bewley, T** (2013) [New horizons in sphere-packing theory. part II: lattice-based derivative-free optimization via global surrogates](#), *Journal of Global Optimization* **56**, 61-91. ([citations](#))
36. Bozsak, F., Gonzalez-Rodriguez, D., Stemberger, Z, Belitz, P., **Bewley, T**, Chomaz, J.-M., Barakat, A.I. (2015) [Optimization of Drug Delivery by Drug-Eluting Stents](#), *PLoS ONE* **10** (6): e0130182. ([citations](#))
37. Morozovsky, N., & **Bewley, T** (2015) [Stair Climbing via Successive Perching](#), *IEEE/ASME Transactions on Mechatronics* **20** (6), 2973-2982.

Bibliography - Prof Thomas Bewley

38. Cavaglieri, D., & **Bewley, T** (2015) [Low-storage implicit/explicit Runge–Kutta schemes for the simulation of stiff high-dimensional ODE systems](#), *Journal of Computational Physics* **286** C, 172-193. ([citations](#))
39. **Bewley, T**, Luchini, P., & Pralits, J. (2016) [Methods for solution of large optimal control problems that bypass open-loop model reduction](#), *Meccanica* **51** (12), 2997-3014. ([citations](#))
40. **Bewley, T**, & Meneghello, G. (2016) [Efficient coordination of swarms of sensor-laden balloons for persistent, in situ, real-time measurement of hurricane development](#), *Phys. Rev. Fluids* **1**, 060507.
41. Beyhaghi, P., Cavaglieri, D., & **Bewley, T** (2016) [Delaunay-based derivative-free optimization via global surrogates, part I: linear constraints](#), *Journal of Global Optimization* **66** (3), 331-382. ([citations](#))
42. Beyhaghi, P. & **Bewley, T** (2016) [Delaunay-based derivative-free optimization via global surrogates, part II: convex constraints](#), *Journal of Global Optimization* **66** (3), 383-415. ([citations](#))
43. Beyhaghi, P, **Bewley, T** (2017) [Implementation of Cartesian grids to accelerate Delaunay-based derivative-free optimization](#), *Journal of Global Optimization* **69**, p. 927–949.
44. Meneghello, G., Luchini, P., & **Bewley, T** (2018) [A probabilistic framework for the control of systems with discrete states and stochastic excitation](#), *Automatica* **88** (2), 113-116.
45. Alimo, S, Beyhaghi, P, **Bewley, T** (2019) [Delaunay-based global optimization in nonconvex domains defined by hidden constraints](#), *Evolutionary and Deterministic Methods for Design Optimization and Control With Applications to Industrial and Societal Problems*, 261-271. [Springer Nature](#).
46. Alimo, R, Beyhaghi, P, **Bewley, T** (2020) [Delaunay-based derivative-free optimization via global surrogates. Part III: nonconvex constraints](#), *Journal of Global Optimization* **77**, 743-776.
47. Beyhaghi, P, Alimo, R, **Bewley, T** (2020) [A derivative-free optimization algorithm for the efficient minimization of functions obtained via statistical averaging](#), *Computational Optimization and Applications*, **76** (1), pp. 1-31.
48. Alimo, R, Cavaglieri, D, Beyhaghi, P, & **Bewley, T** (2021) [Design of IMEXRK time integration schemes via Delaunay-based derivative-free optimization with nonconvex constraints and grid-based acceleration](#), *Journal of Global Optimization* **79** (3), 567-591.
49. Talke, K, Birchmore, F, & **Bewley, T** (2022) [Autonomous hanging tether management and experimentation for an unmanned air-surface vehicle team](#), *Journal of Field Robotics* **39**, 869–887.
50. Gong, Z, Zhao, M, **Bewley, T**, & Herbert, S (2023) [Constructing Control Lyapunov-Value Functions Using Hamilton-Jacobi Reachability Analysis](#), *IEEE Control Systems Letters* **7**, 925-930.
51. Floriano, BRO, Hanson, B, **Bewley, T**, Ishihara, JY, Ferreira, HC (2025) [A novel policy for coordinating a hurricane monitoring system using a swarm of buoyancy-controlled balloons trading off communication and coverage](#), *Engineering Applications of Artificial Intelligence* **139**, 109495, 1-11.
52. Hanson, B, Zhao, M, & **Bewley, T** (2025) [An extensible framework for probabilistic search of stochastically-moving targets characterized by generalized Gaussian distributions or experimentally-defined regions of interest](#), *Communications in Statistics - Theory and Methods*, 1–26.

Bibliography - Prof Thomas Bewley

Published conference papers (with [local](#) and [original](#) hyperlinks):

1. **Bewley, T** (1990) [An application of conformal Mappings to General Grid Generation and Potential Flow Problems](#), von Karman Institute for Fluid Dynamics [Technical Note 175](#), 46 pages.
2. **Bewley, T** (1990) [Swept fin induced shock wave / laminar boundary layer interactions - an analytical, computational, and experimental study](#), von Karman Institute for Fluid Dynamics Project Report 1990-31, 74 pages.
3. **Bewley, T**, Choi, H, Temam, R, & Moin, P (1993) [Optimal feedback control of turbulent channel flow](#), [CTR Annual Research Briefs](#). Stanford. ([citations](#))
4. **Bewley, T**, & Moin, P (1994) [Optimal control of turbulent channel flow](#), [Active Control of Vibration and Noise](#), International Mechanical Engineering Congress and Exposition, ASME DE-Vol. **75**, 221-227. Chicago. ([citations](#))
5. Moin, P, & **Bewley, T** (1994) [Application of control theory to turbulence](#), [12th Australasian Fluid Mech. Conf.](#), **109**. Sydney. ([citations](#))
6. **Bewley, T**, Moin, P, & Temam, R (1996) [A method for optimizing feedback control rules for wall-bounded turbulent flows based on control theory](#), [ASME Fluids Engineering Conference, Forum on Control of Transitional and Turbulent Flows](#), ASME-PUBLICATIONS-FED **237**, 279-286. San Diego.
7. **Bewley, T**, & Agarwal, R (1996) [Optimal and robust control of transition](#), [Proc. of the CTR Summer Program](#), 405-432. Stanford.
8. **Bewley, T**, Moin, P, & Temam, R (1997) [Optimal and robust approaches for linear and nonlinear regulation problems in fluid mechanics](#), [AIAA Paper 1997-1872](#), Snowmass. ([citations](#))
9. Temam, R., **Bewley, T**, & Moin, P. (1997) [Control of turbulent flows](#), [18th IFIP TC7 Conference on System Modelling and Optimization](#), Detroit. ([citations](#))
10. **Bewley, T**, Temam, R., & Ziane, M. (1997) [A generalized framework for robust control in fluid mechanics](#), [CTR Annual Research Briefs](#), 299-316. Stanford.
11. Koumoutsakos, P., **Bewley, T**, Hammond, E., & Moin, P. (1997) [Feedback algorithms for turbulence control - Some recent developments](#), [AIAA Paper 1997-2008](#), Snowmass.
12. Cain, AB, **Bewley, T**, Freund, JB, & Colonius, T (1998) [An approach to systems modeling for real-time control of jet flows](#), [Proc. of the CTR Summer Program](#), 133-139. Stanford.
13. **Bewley, T** (1999) [On the applicability of linear feedback for nonlinear systems in fluid mechanics](#), [ACC](#), San Diego.
14. **Bewley, T** (1999) [New Frontiers for Control in Fluid Mechanics: A Renaissance approach](#), ASME/JSME Joint Fluids Engineering Conference, [FEDSM99-6926](#). San Francisco.
15. Hogberg, M., & **Bewley, T** (2000) [Spatially-localized convolution kernels for feedback control of transitional flows](#), [CDC](#), Sydney.
16. Baggett, JS, Nicoud, F, Mohammadi, B, **Bewley, T**, Gullbrand, J, & Botella, O (2000) [Sub-optimal control based wall models for LES—including transpiration velocity](#), [Proc. of the CTR Summer Program](#), 331-342. Stanford.
17. Aamo, OM, Krstic, M, & **Bewley, T** (2001) [Fluid mixing by feedback in Poiseuille flow](#), [ACC](#), Arlington.
18. Cervino, LI, **Bewley, T**, Freund, JB, & Lele, SK (2002) [Perturbation and adjoint analyses of flow-acoustic interactions in an unsteady 2D jet](#), [Proc. of the CTR Summer Program](#), 27-40. Stanford. ([citations](#))

Bibliography - Prof Thomas Bewley

19. Blossey, PN, Narayanan, S, & **Bewley, T** (2002) [Dynamics & Control of Jets in Crossflow: Direct numerical simulations & experiments](#), [IUTAM Symposium on Turbulent Mixing and Combustion](#), 45-57. Kingston, Ontario.
20. Lauga, E, & **Bewley, T** (2001) [H_{inf} control of linear global instability in models of non-parallel wakes](#), [Second Symposium on Turbulence and Shear Flow Phenomena \(TSFP\)](#), 247-252. Stockholm.
21. Hogberg, M, **Bewley, T**, Berggren, M, & Henningson, D (2001) [Optimal control of transition initiated by oblique waves in channel flow](#) [Second Symposium on Turbulence and Shear Flow Phenomena \(TSFP\)](#), 157-161. Stockholm.
22. **Bewley, T**, & Trenchea, C. (2002) [Noncooperative optimizations of controls for time-periodic Navier-Stokes systems with multiple solutions](#), 1st AIAA Flow Control Conference [AIAA Paper 2002-2754](#). St. Louis. **Invited lecture.**
23. **Bewley, T** (2002) [The emerging roles of model-based control theory in fluid mechanics](#). Advances in Turbulence IX (Editors: Castro, Hancock, & Thomas). [Proceedings of the Ninth European Turbulence Conference](#), 553-564. Southampton. **Invited lecture.**
24. Protas, B, & **Bewley, T** (2002) [Regularization opportunities in the adjoint analysis of multiscale systems](#). Advances in Turbulence IX. [Proceedings of the Ninth European Turbulence Conference](#), 505-510. Southampton.
25. Bewley, T (2002) [Skin friction and pressure: the “footprints” of turbulence](#) [Proceedings of the 3rd Symposium on Smart Control of Turbulence](#). Tokyo. **Invited lecture.**
26. Cathalifaud, P, & **Bewley, T** (2002) [A Numerically Tractable Global Framework for the Feedback Control of Boundary-Layer Perturbations](#) ASME Fluids Engineering Division Summer Meeting, [FEDSM2002-31062](#). Montreal, Quebec.
27. **Bewley, T**, & Aamo, OM (2002) [On the Search for Fundamental Performance Limitations in Fluid-Mechanical Systems](#), ASME Fluids Engineering Division Summer Meeting, [FEDSM2002-31063](#). Montreal, Quebec.
28. Liu, S., & **Bewley, T** (2003) [Adjoint-based system identification and feedforward control optimization in automotive powertrain subsystems](#), [ACC](#). Denver.
29. Luo, H., & **Bewley, T** (2003) [Design, modeling, and optimization of compliant tensegrity fabrics for the reduction of turbulent skin friction](#), [SPIE Paper 5049-57](#). San Diego.
30. Cathalifaud, P., & **Bewley, T** (2003) [A noncausal strategy for feedback control of spatially-parabolic flow systems](#), [CDC](#). Maui.
31. Cervino, L.I., & **Bewley, T** (2003) [Adjoint analysis and control opportunities in a 2D jet](#), [CDC](#). Maui.
32. Cathalifaud, P., & **Bewley, T** (2003) [A noncausal framework for model-based feedback control of spatially-developing perturbations in boundary layers](#), [AIAA Paper 2003-3572](#). Orlando.
33. Chevalier, M, Hoepffner, J, **Bewley, T**, & Henningson, DS (2004) [Turbulent channel flow estimation](#), Advances in Turbulence X. [Proceedings of the Tenth European Turbulence Conference](#). Trondheim.
34. Luo, H., & **Bewley, T** (2005) [Accurate simulation of near-wall turbulence over a compliant tensegrity fabric](#), [SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring](#), [SPIE Paper 5757-17](#), 184-197. San Diego. ([citations](#))
35. Schmidt-Wetekam, C., Zhang, D., Hughes, R., & **Bewley, T** (2007) [Design, optimization, and control of a new class of reconfigurable hopping rovers](#), [CDC](#), 5150-5155. New Orleans.

Bibliography - Prof Thomas Bewley

36. Summers, S., & **Bewley, T** (2007) [MPDopt: A versatile toolbox for adjoint-based model predictive control of smooth and switched nonlinear dynamic systems](#), [CDC](#), 4785-4790. New Orleans.
37. Cessna, J., Colburn, C., & **Bewley, T** (2007) [Multiscale retrograde estimation and forecasting of chaotic nonlinear systems](#), [CDC](#) 2205-2210. New Orleans.
38. Belitz, P., & **Bewley, T** (2007) [Efficient derivative-free optimization](#), [CDC](#), 5358-5363. New Orleans.
39. **Bewley, T**, Pralits, J., & Luchini, P. (2007) [Minimal-energy control feedback for stabilization of bluff-body wakes based on unstable open-loop eigenvalues and left eigenvectors](#), [Fifth Conference on Bluff Body Wakes and Vortex-Induced Vibrations \(BBVIV5\)](#), 237-240. Bahia, Brazil.
40. **Bewley, T**, Cessna, J., Colburn, C., Ham, F., Iaccarino, G., & Wang, Q. (2008) [Object-oriented implementation of the EnVE estimation/forecasting algorithm and its application to high-performance turbulence codes](#), [Proc. of the CTR Summer Program](#), 127-140. Stanford.
41. Kitiashvili, IN, Kosovichev, AG, **Bewley, T**, Cessna, J., & Colburn, C (2008) [Application of data assimilation methods to a dynamo model with turbulent magnetic helicity](#), [CTR Annual Research Briefs](#), 75-87. Stanford.
42. Belitz, P., & **Bewley, T** (2008) ["Checkers" - highly efficient derivative-free optimization](#), [4th Flow Control Conference](#), [AIAA 2008-4313](#). Seattle.
43. Cessna, J., Colburn, C., & **Bewley, T** (2008) [EnVE: A new estimation algorithm for weather forecasting and flow control](#), [4th Flow Control Conference](#), [AIAA 2008-4314](#). Seattle.
44. Cessna, J., & **Bewley, T** (2009) [Honeycomb-structured computational interconnects and their scalable extension to spherical domains](#), [System Level Interconnect Prediction \(SLIP\)](#), 27-36. San Francisco.
45. Krohn, R., & **Bewley, T** (2010) [Underactuated control and distribution of multi-agent systems in stratified flow environments](#), [CDC](#), 2990-2995. Atlanta.
46. Schmidt-Wetekam, C., & **Bewley, T** (2011) [An arm suspension mechanism for an underactuated single legged hopping robot](#), [ICRA](#), 5529-5534. Shanghai.
47. Schmidt-Wetekam, C., Morozovsky, N., & **Bewley, T** (2011) [Inertial Rotation Center Position Estimation for a Perching Treaded Vehicle](#), [IROS](#), 4097-4102. San Francisco.
48. Morozovsky, N., Schmidt-Wetekam, C., & **Bewley, T** (2011) [Switchblade: An Agile Treaded Rover](#), [IROS](#), 2741-2746. San Francisco.
49. Zhang, D., Colburn, C., & **Bewley, T** (2011) [Estimation and adaptive observation of environmental plumes](#), [ACC](#). San Francisco.
50. Karimi, M, Woodard, K, Sams, BA, & **Bewley, T** (2012) [The Walk-&-Roller: A multimodal robotic vehicle capable of quasistatic three-legged rolling motion](#), [IEEE International Conference on Robotics and Biomimetics](#) (ROBIO). Guangzhou, China.
51. Cavaglieri, D, Beyhaghi, P, & **Bewley, T** (2013) [Low-storage IMEX Runge-Kutta schemes for the simulation of Navier-Stokes systems](#), [AIAA Computational Fluid Dynamics](#), [AIAA 2013-3094](#). San Diego.
52. Morozovsky, N, **Bewley, T** (2013) [SkySweeper: A low DOF, dynamic high wire robot](#), [IROS](#), 2339-2344. Tokyo. ([citations](#))
53. Friesen J., Pogue, A., **Bewley, T**, de Oliveira, M., Skelton, R., & Sunspiral, V. (2014) [DuCTT: A tensegrity robot for exploring duct systems](#), [ICRA](#), 4222-4228. Hong Kong. ([citations](#))

Bibliography - Prof Thomas Bewley

54. Cavaglieri, D, **Bewley, T**, Previsic, M (2015) [Model Predictive Control leveraging Ensemble Kalman forecasting for optimal power take-off in wave energy conversion systems](#). *ACC*, 224-5230. Chicago.
55. **Bewley, T**, Strawson, J., & Briggs, H.C. (2015) [Leveraging Open Standards and Credit-Card-Sized Linux Computers in Embedded Control & Robotics Education](#), *SciTech*, *AIAA 2015-0801*. Kissimmee.
56. Yang, D., Sihite, E., Friesen, J., & **Bewley, T** (2015) [Design and control of a micro ball-balancing robot \(MBBR\) with orthogonal midlatitude omniwheel placement](#), *IROS*, 4098–4104. Hamburg, Germany.
57. Meneghello, G., Luchini, P., & **Bewley, T** (2016) [On the control of buoyancy-driven devices in stratified, uncertain flowfields](#), *VIIIth Int. Symp. on Stratified Flows (ISSF)*, 1-6. San Diego.
58. Friesen, J., Glick, P., Fanton, M., Manovi, P., Xydes, A., **Bewley, T**, & Sunspirial, V. (2016) [The second generation prototype of a Duct Climbing Tensegrity robot, DuCTTv2](#), *ICRA*, 2123-2128. Stockholm. ([citations](#))
59. Briggs, HC, Strawson, J, **Bewley, T** (2016) [Extending Low-Cost Linux Computers for Education and Applications in Embedded Control and Robotics](#). *AIAA Structures, Structural Dynamics, and Materials Conference*, *AIAA 2016-0825*, 1-12. San Diego.
60. Alimo, S, Beyhaghi, P, **Bewley, T** (2017) [Optimization combining derivative-free global exploration with derivative-based local refinement](#). *CDC*, 2531-2538. Melbourne, Australia.
61. Alimo, S, Beyhaghi, P, Meneghello, G, **Bewley, T** (2017) [Delaunay-based optimization in CFD leveraging multivariate adaptive polyharmonic splines \(MAPS\)](#). *AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, *AIAA 2017-0129*, 1-16. Grapevine, Texas.
62. Meneghello, G, **Bewley, T**, de Jong, M, & Briggs, HC (2017) [A coordinated balloon observation system for sustained in-situ measurements of hurricanes](#). *IEEE Aerospace Conference*, 1-6. Big Sky.
63. **Bewley, T**, Luchini, P (2018) [Implementation of boostconv to accelerate the oppositely-shifted subspace iteration \(OSSl\) method for approximate optimal control without model reduction](#), *13th ERCOFTAC SIG 33 Workshop, Progress in Flow Instability, Transition and Control*, 33. Paraty, Brazil.
64. Luchini, P, **Bewley, T**, Meneghello, G (2018) [Optimal guidance of buoyancy-controlled balloons in turbulent flows using a nonquadratic objective and discontinuous actuation](#), *13th ERCOFTAC SIG 33 Workshop, Progress in Flow Instability, Transition and Control*, 34. Paraty, Brazil.
65. Talke, K, de Oliveira, M, **Bewley, T** (2018) [Catenary tether shape analysis for a UAV-USV team](#). *IROS*, 7803–7809. Madrid, Spain. ([citations](#))
66. Yang, D, **Bewley, T** (2018) [A minimalist Stair Climbing Robot \(SCR\) formed as a leg balancing & climbing Mobile Inverted Pendulum \(MIP\)](#) *IROS*, 2464–2469. Madrid, Spain.
67. Friesen, J, Dean, J, **Bewley, T**, Sunspirial, V (2018) [A Tensegrity-Inspired Compliant 3-DOF Compliant Joint](#), *ICRA*, p. 3301–3306. Brisbane, Australia. ([citations](#))
68. Sihite, E, **Bewley, T** (2018) [Attitude estimation of a high-yaw-rate Mobile Inverted Pendulum: comparison of Extended Kalman Filtering, Complementary Filtering, and motion capture](#). *ACC*, 5831-5836. Milwaukee.
69. Zhao, M, Alimo, S. R, **Bewley, T** (2018) [An active subspace method for accelerating convergence in Delaunay-based optimization via dimension reduction](#). *CDC*, 2765-2770. Miami.
70. Duenas, J, Nezampasandarababi, F, **Bewley, T** (2019) [A systems engineering Persistence Of Vision teaching module integrating coordinated sensing, actuation, multithreaded computation, custom PCB design, and inductive power transfer](#). *Scitech*, *AIAA 2019-0063*, 1-9. San Diego.

Bibliography - Prof Thomas Bewley

71. Sihite, E, Yang, D, **Bewley, T** (2019) [Modeling and state estimation of a Micro Ball-balancing Robot using a high yaw-rate dynamic model and an Extended Kalman Filter](#). *ICRA*, 8577–8583. Montreal.
72. Sihite, E, Yang, D, **Bewley, T** (2019) [Derivation of a new drive/coast motor driver model for real-time brushed DC motor control, and validation on a MIP robot](#). *IEEE Conference on Automation Science and Engineering (CASE)*, 1099-1105. Vancouver, BC.
73. Talke, K, Drotman, D, Stroumtsos, N, de Oliveira, M, **Bewley, T** (2019) [Design and parameter optimization of a 3-PSR parallel mechanism for replicating wave and boat motion](#), *ICRA*, 7955–7961. Montreal.
74. Zhao, M, Alimo, S, Beyhaghi, P, **Bewley, T** (2019) [Delaunay-based Derivative-free Optimization via Global Surrogates with Safe and Exact Function Evaluations](#), *CDC*, 4636-4641. Nice, France.
75. Subramanian, A, Alimo, R, Gill, P, & **Bewley, T** (2020) [A Probabilistic Path Planning Framework for Optimizing Feasible Trajectories of Autonomous Search Vehicles Leveraging the Projected-Search Reduced Hessian \(LRH-B\) Method](#). *Scitech*, *AIAA 2020-0987*, 1-8. Orlando.
76. Beyhaghi, P, Alimo, S, Zhao, M, **Bewley, T** (2020) [A Delaunay-based method for optimizing infinite time averages of numerical discretizations of ergodic systems](#). *Scitech*, *AIAA 2020-0903*, 1-12. Orlando.
77. Lally, M, Chamieh, M, Daruwala, R, Duong, V, Hall, H, Holt, S, Nguyen, L, Rafizadeh, R., Fah, P. S, Weng, K, Yuan, C, **Bewley, T**, Alimo, SR, Derewa, C, (2020) [Tethered Balloon-Based Experiment of Surface Water Height Using Satellite Signals of Opportunity](#). *IEEE Aerospace*, 1-7. Big Sky.
78. Zheng, Z, **Bewley, T**, Kuester, F (2020) [Point Cloud-Based Target-Oriented 3D Path Planning for UAVs](#). *International Conference on Unmanned Aircraft Systems (ICUAS)*, 790-798. Athens, Greece.
79. Claudet, T, **Bewley, T**, Alimo, S (2021) [Stabilization of a Planetary-Explorer Balloon-Payload System using Tensegrity](#), *Scitech*, *AIAA 2021-0741*, 1-16. Online (covid).
80. Cao, P, Strawson, J, **Bewley, T**, & Kuester, F (2021) [Decoupled translational and rotational flight control designs of canted-rotor hexacopters](#), *Scitech*, *AIAA 2021-1058*, 1-13. Online (covid).
81. Strawson, J, Cao, P, Tran, D, **Bewley, T**, & Kuester, F (2021) [Monocoque Multirotor Airframe Design with Rotor Orientations Optimized for Direct 6-DoF UAV Flight Control](#). *AIAA Aviation*, *AIAA 2021-2431*, 1-11. Online (covid).
82. Strawson, J, Cao, P, **Bewley, T**, & Kuester, F (2021) [Rotor orientation optimization for direct 6 degree of freedom control of multirotors](#). *IEEE Aerospace (50100)*, 1-12. Big Sky.
83. Jang, J, & **Bewley, T** (2021) [Tension optimization of a 6-DOF cable-driven boat motion simulator](#), *Conference on Robotics Systems and Automation Engineering (RSAE)*, 57-64. Paris.
84. Jang, J, Zhao, M, & **Bewley, T** (2022) [A Control Lyapunov Function-based Quadratic Program for a Cable-driven Boat Motion Simulator](#) *International Conference on Robotics and Automation Engineering (ICRAE)*, 18-24. Singapore.
85. Cao, P, Strawson, J, Zhu, X, Zhou, E, Lazar, C, Meyer, D, Zheng, Z, **Bewley, T**, Kuester, F (2022) [BeagleRover: An Open-Source 3D-Printable Robotic Platform for Engineering Education and Research](#), *Scitech*, *AIAA 2022-1914*, 1-16. San Diego.
86. Cao, P, Hwang, JT, **Bewley, T**, & Kuester, F (2022) [Mission-Oriented Trajectory Optimization for Search-and-Rescue Multirotor UAVs in Cluttered and GPS-Denied Environments](#) *AIAA Aviation*, *AIAA 2022-3999*. Chicago.
87. Jang, J, & **Bewley, T** (2023) [Workspace Analysis for Parameter Optimization of a Cable-driven Boat Motion Simulator](#) *International Conference on Control and Robotics (ICCR)*. Tokyo.

Bibliography - Prof Thomas Bewley

88. Jang, J, Macias, MAM, & **Bewley, T** (2023) [Camera Image Based Moving Platform Rotation Estimation for Quadrotor Landing](#), [International Conference on Control and Robotics Engineering \(ICCRE\)](#), 143-149. Niigata, Japan.
89. Cao, P, **Bewley, T**, & Kuester, F (2023) [Cluster-based Dynamic Object Filtering via Egocentric Motion Detection for Building Static 3D Point Cloud Maps](#) [IEEE International Conference on Robotic Computing \(IRC\)](#), 368-372. Laguna Hills, California.
90. Cao, P, Phillips, J, **Bewley, T**, & Kuester, F (2023) [QuadGlider: Towards the Design and Control of a Bio-Inspired Multi-Modal UAV with Compliant Wings](#) [IEEE Aerospace](#), 1-17. Big Sky.
91. Jang, J, Hooker, Z, Wan, T-Y, Tejada, P, & **Bewley, T** (2024) [Design and characterization of torsion spring-motor integrated Series Elastic Actuators](#), [International Conference on Control and Robotics \(ICCR\)](#), 1-6. (Excellent Oral Presentation Winner). Lyon, France.
92. Hanson, B, Rosengren, A, & **Bewley, T** (2024) [State estimation of chaotic trajectories: a higher-dimensional, grid-based, Bayesian approach to uncertainty propagation](#), [AIAA/AAS Space Flight Mechanics Meeting](#), [AAS 24-426](#), 1-20. Orlando.
93. Hanson, B, Rosengren, A, & **Bewley, T** (2025) [Non-Gaussian recursive Bayesian filtering for outer planetary orbilander navigation](#), [AIAA/AAS Space Flight Mechanics Meeting](#), AAS 25-194, 1-20. Lihue, Kauai.

A few Significant Abstracts (with hyperlinks):

- **Bewley, T** (2015) [New methods for state estimation and adaptive observation of environmental flow systems leveraging coordinated swarms of sensor vehicles](#) **APS-DFD Plenary Lecture**. Boston.
 - **Bewley, T**, Luchini, P, Meneghello, G (2019) [A new Drunken Sailor perspective and Spontaneously Singular Control approach for Lagrangian particles \(buoyancy-controlled balloons\) in highly stratified turbulence](#), APS-DFD. Seattle.
 - **Bewley, T** (2019) [Autonomous balloon swarms for persistent, in situ, real-time measurement of hurricanes, and a Drunken Sailor perspective and Spontaneously Singular Control approach for Lagrangian particles in turbulence](#). [GALCIT Colloquium, Caltech](#). March 15. (slides available [here](#))
 - **Bewley, T** (2024) [Blowin' in the wind](#), APS-DFD. Salt Lake City.
- + many older talks with abstracts only, especially at APS-DFD.

Bibliography - Prof Thomas Bewley

PATENTS (WITH HYPERLINKS)

US Patents (granted)

US Patent number [8083013](#): Multimodal agile robots
US Patent number [9020639](#): Multimodal dynamic robotic systems
US Patent number [9757855](#): Multimodal dynamic robotic systems
US Patent number [9902058](#): Multimodal dynamic robotic systems
US Patent number [10611019](#): Multimodal dynamic robotic systems
US Patent number [10189342](#): Ball-balancing robot and drive assembly therefor
(Note: I am the first author on all six of the above patents, each of which is assigned to the UC Regents.)

International (PCT) patent (applied for)

UC San Diego Patent Case SD2023-185: [A new class of stable, spring-loaded, planar, roll-controlled, highly maneuverable robots for interior exploration of networks of pipes and ducts](#) [use password [checkers123](#)].

OTHER CREATIVE PRODUCTS

Submitted manuscripts (with hyperlinks):

1. [Pairwise-nonrecurrent sequences](#) (*Journal of Integer Sequences*)
 2. [GBEES-GPU: An efficient parallel GPU algorithm for high-dimensional nonlinear uncertainty propagation](#) (*Computer Physics Communications*).
 3. [Reversible random number generation](#) (*ACM Transactions on Mathematical Software*)
 4. [A new method for approximating proportional representation in multi-seat elections based on range or approval voting](#) (*Quarterly Journal of Political Science*)
 5. [A new robot design for the interior exploration and inspection of pipe networks](#) (*Science Robotics*)
 6. [Probabilistic search of stochastically moving targets using optimized time-periodic orbits of multiple search vehicles](#) (*Automatica*)
 7. [Emergence of a spontaneous singularity in the optimal guidance of buoyancy-controlled balloons in hurricanes with an absolute value penalty on the control](#) (*JFM*)
-
1. [A miniature robot designed for internal inspection of 2-inch ID pipes with elbows](#) (*IROS*)
 2. [Belted Pipe Robot: A robot for internal inspection of 2-inch pipes](#) (*ICRA*)

Teaching statement

Bewley, T (2024) [The Art of Teaching and Learning: fostering Understanding and Creativity in an age of Information and Data](#)

Online resources

Bewley, T (2021-2025) [Renaissance Robotics: embedding multithreaded real-time feedback into mobile robots and cyber-physical systems](#). Available online.

Bewley, T (2000-2025) [Numerical Renaissance: simulation, optimization, & control](#). Available online. ([citations](#))

Bewley, T (2018-2025) [Renaissance Repository](#). Github repository of several hundred pedagogical Matlab codes, supporting Renaissance Robotics and Numerical Renaissance (above), available online.