

# Todd D Murphey

## List of Publications by Year in descending order

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163  
papers

2,160  
citations

331538

21  
h-index

345118

36  
g-index

169  
all docs

169  
docs citations

169  
times ranked

1408  
citing authors

#	ARTICLE	IF	CITATIONS
1	Mechanical computing. Nature, 2021, 598, 39-48.	13.7	101
2	Active Learning of Dynamics for Data-Driven Control Using Koopman Operators. IEEE Transactions on Robotics, 2019, 35, 1071-1083.	7.3	92
3	Ergodic Exploration of Distributed Information. IEEE Transactions on Robotics, 2016, 32, 36-52.	7.3	79
4	Massive increase in visual range preceded the origin of terrestrial vertebrates. Proceedings of the National Academy of Sciences of the United States of America, 2017, 114, E2375-E2384.	3.3	78
5	Modeling Forces and Moments at the Base of a Rat Vibrissa during Noncontact Whisking and Whisking against an Object. Journal of Neuroscience, 2014, 34, 9828-9844.	1.7	66
6	Switching mode generation and optimal estimation with application to skid-steering. Automatica, 2011, 47, 50-64.	3.0	65
7	Sequential Action Control: Closed-Form Optimal Control for Nonlinear and Nonsmooth Systems. IEEE Transactions on Robotics, 2016, 32, 1196-1214.	7.3	62
8	Model-Based Control Using Koopman Operators. , 0, , .		62
9	Real-Time Area Coverage and Target Localization Using Receding-Horizon Ergodic Exploration. IEEE Transactions on Robotics, 2018, 34, 62-80.	7.3	59
10	Scalable Variational Integrators for Constrained Mechanical Systems in Generalized Coordinates. IEEE Transactions on Robotics, 2009, 25, 1249-1261.	7.3	57
11	A robot made of robots: Emergent transport and control of a smarticle ensemble. Science Robotics, 2019, 4, .	9.9	53
12	Derivative-Based Koopman Operators for Real-Time Control of Robotic Systems. IEEE Transactions on Robotics, 2021, 37, 2173-2192.	7.3	48
13	Convergence-Preserving Switching for Topology-Dependent Decentralized Systems. IEEE Transactions on Robotics, 2008, 24, 1405-1415.	7.3	44
14	Low rattling: A predictive principle for self-organization in active collectives. Science, 2021, 371, 90-95.	6.0	44
15	The Geography of Fatty Infiltrates Within the Cervical Multifidus and Semispinalis Cervicis in Individuals With Chronic Whiplash-Associated Disorders. Journal of Orthopaedic and Sports Physical Therapy, 2015, 45, 281-288.	1.7	43
16	Local Koopman Operators for Data-Driven Control of Robotic Systems. , 0, , .		42
17	Second-Order Switching Time Optimization for Nonlinear Time-Varying Dynamic Systems. IEEE Transactions on Automatic Control, 2011, 56, 1953-1957.	3.6	41
18	Trajectory optimization for continuous ergodic exploration. , 2013, , .		37

#	ARTICLE	IF	CITATIONS
19	Learning Models for Shared Control of Human-Machine Systems with Unknown Dynamics. , 0, , .		32
20	Control of Nonprehensile Manipulation. , 2003, , 39-57.		28
21	Trajectory Synthesis for Fisher Information Maximization. IEEE Transactions on Robotics, 2014, 30, 1358-1370.	7.3	27
22	Active learning in robotics: A review of control principles. Mechatronics, 2021, 77, 102576.	2.0	27
23	Structured Linearization of Discrete Mechanical Systems for Analysis and Optimal Control. IEEE Transactions on Automation Science and Engineering, 2015, 12, 140-152.	3.4	25
24	Data-driven Koopman operators for model-based shared control of human-machine systems. International Journal of Robotics Research, 2020, 39, 1178-1195.	5.8	23
25	Dynamic Modeling and Motion Planning for Marionettes: Rigid Bodies Articulated by Massless Strings. Proceedings - IEEE International Conference on Robotics and Automation, 2007, , .	0.0	21
26	Single Integration Optimization of Linear Time-Varying Switched Systems. IEEE Transactions on Automatic Control, 2012, 57, 1592-1597.	3.6	21
27	Tactile proprioceptive input in robotic rehabilitation after stroke. , 2015, , .		21
28	Ergodic Exploration Using Binary Sensing for Nonparametric Shape Estimation. IEEE Robotics and Automation Letters, 2017, 2, 827-834.	3.3	21
29	Decentralized Ergodic Control: Distribution-Driven Sensing and Exploration for Multiagent Systems. IEEE Robotics and Automation Letters, 2018, 3, 2987-2994.	3.3	20
30	Switching Rules for Decentralized Control with Simple Control Laws. Proceedings of the American Control Conference, 2007, , .	0.0	19
31	Trajectory generation for underactuated control of a suspended mass. , 2012, , .		19
32	Trajectory Optimization for Well-Conditioned Parameter Estimation. IEEE Transactions on Automation Science and Engineering, 2015, 12, 28-36.	3.4	19
33	CPL-SLAM: Efficient and Certifiably Correct Planar Graph-Based SLAM Using the Complex Number Representation. IEEE Transactions on Robotics, 2020, 36, 1719-1737.	7.3	18
34	Motion Programs for Puppet Choreography and Control. Lecture Notes in Computer Science, 2007, , 190-202.	1.0	18
35	Highly Parallelized Data-Driven MPC for Minimal Intervention Shared Control. , 0, , .		18
36	Tuning movement for sensing in an uncertain world. ELife, 2020, 9, .	2.8	18

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37	Dynamic Task Execution Using Active Parameter Identification With the Baxter Research Robot. IEEE Transactions on Automation Science and Engineering, 2017, 14, 391-397.	3.4	17
38	Model-Based Generalization Under Parameter Uncertainty Using Path Integral Control. IEEE Robotics and Automation Letters, 2020, 5, 2864-2871.	3.3	17
39	Sensory Agreement Guides Kinetic Energy Optimization of Arm Movements during Object Manipulation. PLoS Computational Biology, 2016, 12, e1004861.	1.5	16
40	Augmenting sensorimotor control using goal-aware vibrotactile stimulation during reaching and manipulation behaviors. Experimental Brain Research, 2016, 234, 2403-2414.	0.7	16
41	Optimal planning for information acquisition. , 2013, , .		15
42	Switching time optimization in discretized hybrid dynamical systems. , 2012, , .		14
43	Optimal planning for target localization and coverage using range sensing. , 2015, , .		14
44	Feedback synthesis for underactuated systems using sequential second-order needle variations. International Journal of Robotics Research, 2018, 37, 1826-1853.	5.8	14
45	Automatic Tuning for Data-driven Model Predictive Control. , 2021, , .		12
46	Majorization Minimization Methods for Distributed Pose Graph Optimization with Convergence Guarantees. , 2020, , .		12
47	Trajectory optimization for continuous ergodic exploration on the motion group SE(2). , 2013, , .		11
48	An Ergodic Measure for Active Learning From Equilibrium. IEEE Transactions on Automation Science and Engineering, 2021, 18, 917-931.	3.4	11
49	Real-time trajectory synthesis for information maximization using Sequential Action Control and least-squares estimation. , 2015, , .		10
50	Real-Time Dynamic-Mode Scheduling Using Single-Integration Hybrid Optimization. IEEE Transactions on Automation Science and Engineering, 2016, 13, 1385-1398.	3.4	10
51	Optimal human-in-the-loop interfaces based on Maxwell's Demon. , 2016, , .		10
52	Model-Based Reactive Control for Hybrid and High-Dimensional Robotic Systems. IEEE Robotics and Automation Letters, 2016, 1, 431-438.	3.3	10
53	Minimum sensitivity control for planning with parametric and hybrid uncertainty. International Journal of Robotics Research, 2016, 35, 823-839.	5.8	10
54	Trust Adaptation Leads to Lower Control Effort in Shared Control of Crane Automation. IEEE Robotics and Automation Letters, 2017, 2, 239-246.	3.3	10

#	ARTICLE	IF	CITATIONS
55	Ergodicity reveals assistance and learning from physical human-robot interaction. Science Robotics, 2019, 4, .	9.9	10
56	Teaching Rigid Body Mechanics Using Student-Created Virtual Environments. IEEE Transactions on Education, 2008, 51, 45-52.	2.0	9
57	Discrete and continuous mechanics for tree representations of mechanical systems. , 2008, , .		9
58	Second order switching time optimization for time-varying nonlinear systems. , 2009, , .		9
59	Variational solutions to simultaneous collisions between multiple rigid bodies. , 2010, , .		9
60	Constructing and Implementing Motion Programs for Robotic Marionettes. IEEE Transactions on Automatic Control, 2011, 56, 902-907.	3.6	9
61	Optimal motion planning for a class of hybrid dynamical systems with impacts. , 2011, , .		9
62	Structure-preserving local optimal control of mechanical systems. Optimal Control Applications and Methods, 2019, 40, 310-329.	1.3	9
63	Task-based hybrid shared control for training through forceful interaction. International Journal of Robotics Research, 2020, 39, 1138-1154.	5.8	9
64	A Variational Approach to Strand-Based Modeling of the Human Hand. Springer Tracts in Advanced Robotics, 2009, , 151-166.	0.3	9
65	Online User Assessment for Minimal Intervention During Task-Based Robotic Assistance. , 0, , .		9
66	Control-on-request: Short-burst assistive control for long time horizon improvement. , 2015, , .		8
67	Controllers as filters: Noise-driven swing-up control based on Maxwell's demon. , 2015, , .		8
68	Optimal control-on-request: An application in real-time assistive balance control. , 2015, , .		8
69	Sequential Action Control for models of underactuated underwater vehicles in a planar ideal fluid. , 2016, , .		8
70	Efficient and Guaranteed Planar Pose Graph optimization Using the Complex Number Representation. , 2019, , .		8
71	Dynamical System Segmentation for Information Measures in Motion. IEEE Robotics and Automation Letters, 2019, 4, 169-176.	3.3	8
72	Control-oriented Modeling of Soft Robotic Swimmer with Koopman Operators. , 2020, , .		8

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73	Ergodic imitation: Learning from what to do and what not to do. , 2021, , .		8
74	Memristor Circuits for Colloidal Robotics: Temporal Access to Memory, Sensing, and Actuation. Advanced Intelligent Systems, 2022, 4, .	3.3	8
75	Effects of optimal tactile feedback in balancing tasks: A pilot study. , 2014, , .		7
76	Autoperforation of two-dimensional materials to generate colloidal state machines capable of locomotion. Faraday Discussions, 2021, 227, 213-232.	1.6	7
77	Online Feedback Control for Input-Saturated Robotic Systems on Lie Groups. , 0, , .		7
78	Second-order DMOC using projection. , 2010, , .		6
79	A backwards error analysis approach for simulation and control of nonsmooth mechanical systems. , 2011, , .		6
80	Control aesthetics in software architecture for robotic marionettes. , 2011, , .		6
81	Variational nonsmooth mechanics via a projected Hamilton's principle. , 2012, , .		6
82	Trajectory planning and tracking of robotic fish using ergodic exploration. , 2017, , .		6
83	Iterative Sequential Action Control for Stable, Model-Based Control of Nonlinear Systems. IEEE Transactions on Automatic Control, 2019, 64, 3170-3183.	3.6	6
84	Ergodic Specifications for Flexible Swarm Control: From User Commands to Persistent Adaptation. , 0, , .		6
85	Data-Driven Measurement Models for Active Localization in Sparse Environments. , 0, , .		6
86	Kinematic reductions for uncertain mechanical contact. Robotica, 2007, 25, 751-764.	1.3	5
87	Impulse optimization for data association. , 2010, , .		5
88	Linearizations for mechanical systems in generalized coordinates. , 2010, , .		5
89	Extending filter performance through structured integration. , 2014, , .		5
90	Structured linearization of discrete mechanical systems on Lie groups: A synthesis of analysis and control. , 2015, , .		5

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91	Ergodic exploration with stochastic sensor dynamics. , 2016, , .		5
92	Data-Driven Gait Segmentation for Walking Assistance in a Lower-Limb Assistive Device. , 2019, , .		5
93	Information Requirements of Collision-Based Micromanipulation. Springer Proceedings in Advanced Robotics, 2021, , 210-226.	0.9	5
94	Experimental Applications of the Koopman Operator in Active Learning for Control. Lecture Notes in Control and Information Sciences, 2020, , 421-450.	0.6	5
95	Discretized switching time optimization problems. , 2013, , .		5
96	Impulsive data association with an unknown number of targets. , 2011, , .		4
97	Optimal contact decisions for ergodic exploration. , 2012, , .		4
98	Simultaneous optimal parameter and mode transition time estimation. , 2012, , .		4
99	Global projections for variational nonsmooth mechanics. , 2012, , .		4
100	Trajectory tracking among landmarks and binary sensor-beams. , 2012, , .		4
101	Simultaneous Optimal Estimation of Mode Transition Times and Parameters Applied to Simple Traction Models. IEEE Transactions on Robotics, 2013, 29, 1496-1503.	7.3	4
102	Symplectic integration for optimal ergodic control. , 2015, , .		4
103	Variational Integrators for Structure-Preserving Filtering. Journal of Computational and Nonlinear Dynamics, 2017, 12, .	0.7	4
104	Decentralized and recursive identification for cooperative manipulation of unknown rigid body with local measurements. , 2017, , .		4
105	A dynamical model for generating synthetic data to quantify active tactile sensing behavior in the rat. Proceedings of the National Academy of Sciences of the United States of America, 2021, 118, .	3.3	4
106	Operation and Imitation Under Safety-Aware Shared Control. Springer Proceedings in Advanced Robotics, 2020, , 905-920.	0.9	4
107	Adaptive cooperative manipulation with intermittent contact. , 2008, , .		3
108	Multiple Instantaneous Collisions in a Variational Framework. , 2009, , .		3

#	ARTICLE	IF	CITATIONS
109	Dangers of two-point holonomic constraints for variational integrators. , 2009, , .		3
110	Conditions for uniqueness in simultaneous impact with application to mechanical design. , 2012, , .		3
111	Minimal parametric sensitivity trajectories for nonlinear systems. , 2013, , .		3
112	Embedded control synthesis using one-step methods in discrete mechanics. , 2013, , .		3
113	Maximizing fisher information using discrete mechanics and projection-based trajectory optimization. , 2015, , .		3
114	Automatic synthesis of control alphabet policies. , 2016, , .		3
115	Ergodic Exploration for Adaptive Sampling of Water Columns Using Gliding Robotic Fish. , 2018, , .		3
116	Algorithmic materials: Embedding computation within material properties for autonomy. , 2019, , 197-221.		3
117	Shoulder abduction loading affects motor coordination in individuals with chronic stroke, informing targeted rehabilitation. , 2020, , .		3
118	Algorithmic Design for Embodied Intelligence in Synthetic Cells. IEEE Transactions on Automation Science and Engineering, 2021, 18, 864-875.	3.4	3
119	Low Complexity Control Policy Synthesis for Embodied Computation in Synthetic Cells. Springer Proceedings in Advanced Robotics, 2020, , 602-618.	0.9	3
120	Hybrid control for combining model-based and model-free reinforcement learning. International Journal of Robotics Research, 2023, 42, 337-355.	5.8	3
121	Mechanical intelligence for learning embodied sensor-object relationships. Nature Communications, 2022, 13, .	5.8	3
122	Trajectory optimization estimator for impulsive data association. , 2011, , .		2
123	Improving object tracking through distributed exploration of an information map. , 2014, , .		2
124	Local E-optimality conditions for trajectory design to estimate parameters in nonlinear systems. , 2014, 2014, 443-450.		2
125	Variational integrators in linear optimal filtering. , 2015, , .		2
126	Hybrid control for tracking of invariant manifolds. Nonlinear Analysis: Hybrid Systems, 2017, 25, 298-311.	2.1	2



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127	Variational integrators for open-loop and closed-loop optimal control of mechanical systems. Proceedings in Applied Mathematics and Mechanics, 2017, 17, 791-792.	0.2	2
128	Superlinear Convergence Using Controls Based on Second-Order Needle Variations. , 2018, , .		2
129	Hybrid Control for Learning Motor Skills. Springer Proceedings in Advanced Robotics, 2021, , 450-466.	0.9	2
130	Generalized Proximal Methods for Pose Graph Optimization. Springer Proceedings in Advanced Robotics, 2022, , 393-409.	0.9	2
131	Teaching Rigid Body Mechanics Using Student-Created Virtual Environments. Proceedings of the American Control Conference, 2007, , .	0.0	1
132	Filtering of interaction rules in cooperation. , 2008, , .		1
133	Automated trajectory synthesis from animation data using trajectory optimization. , 2009, , .		1
134	Local planning using switching time optimization. , 2010, , .		1
135	A projected Lagrange-d'Alembert principle for forced nonsmooth mechanics and optimal control. , 2013, , .		1
136	Optimal trajectory design for well-conditioned parameter estimation. , 2013, , .		1
137	Second-order switching time and magnitude optimization for impulsive hybrid systems. , 2013, , .		1
138	Minimal sensitivity control for hybrid environments. , 2013, , .		1
139	Single-integration mode scheduling for linear time-varying switched systems. , 2014, , .		1
140	Continuous-time optimal control of impacting mechanical systems via a projected Hamilton's principle. , 2014, , .		1
141	A Propagative Model of Simultaneous Impact: Existence, Uniqueness, and Design Consequences. IEEE Transactions on Automation Science and Engineering, 2014, 11, 154-168.	3.4	1
142	Discrete Lagrangian mechanics for nonseparable nonsmooth systems. International Journal for Numerical Methods in Engineering, 2016, 105, 440-463.	1.5	1
143	On the benefits of surrogate Lagrangians in optimal control and planning algorithms. , 2016, , .		1
144	Efficient Computation of Higher-Order Variational Integrators in Robotic Simulation and Trajectory Optimization. Springer Proceedings in Advanced Robotics, 2020, , 689-706.	0.9	1

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145	Adaptive Single Action Control Policies for Linearly Parameterized Systems. , 2019, , .		1
146	Autonomous Visual Rendering using Physical Motion. Springer Proceedings in Advanced Robotics, 2020, , 80-95.	0.9	1
147	Bayesian Particles on Cyclic Graphs. , 2020, , .		1
148	Ergodic Shared Control: Closing the Loop on pHRI Based on Information Encoded in Motion. ACM Transactions on Human-Robot Interaction, 2022, 11, 1-20.	3.2	1
149	Geometric Derived Information Spaces in Manipulation with Mechanical Contact. , 2007, , .		0
150	Data association with ambiguous measurements. , 2008, , .		0
151	Stochastic sampling based data association. , 2010, , .		0
152	Geometric integration of impact during an orbital docking procedure. , 2010, , .		0
153	Linear time-varying impulse optimization for data association. , 2012, , .		0
154	Feature Localization Using Kinematics and Impulsive Hybrid Optimization. IEEE Transactions on Automation Science and Engineering, 2013, 10, 957-968.	3.4	0
155	Optimization for discretized switched systems. Proceedings in Applied Mathematics and Mechanics, 2013, 13, 401-402.	0.2	0
156	Power Network Regulation Benchmark for Switched-Mode Optimal Control. IFAC-PapersOnLine, 2015, 48, 280-285.	0.5	0
157	A variational derivation of LQR for piecewise time-varying systems. , 2015, , .		0
158	Lowâ€œInfrastructure Realâ€œTime Embedded Control via Variational Integrators. Proceedings in Applied Mathematics and Mechanics, 2016, 16, 949-952.	0.2	0
159	Feedback Control for Distributed Manipulation. Springer Tracts in Advanced Robotics, 2004, , 487-503.	0.3	0
160	Assistive Optimal Control-on-Request with Application in Standing Balance Therapy and Reinforcement. , 2017, , 131-151.		0
161	Feedback Synthesis for Controllable Underactuated Systems using Sequential Second Order Actions. , 0, , .		0
162	Active Area Coverage from Equilibrium. Springer Proceedings in Advanced Robotics, 2020, , 284-300.	0.9	0

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163	Programming Play. , 0, , .		0