# Dr. Tamás Molnár

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# Positions

2023 -	Assistant Professor – Wichita State University
2020 - 2023	Postdoctoral Scholar – California Institute of Technology
2018 - 2020	Postdoctoral Scholar and Intermittent Lecturer – University of Michigan, Ann Arbor
2018	Assistant Lecturer – Budapest University of Technology and Economics

# Education

2015 - 2018	PhD in Mechanical Engineering – Budapest University of Technology and Economics
2013 - 2015	MSc in Mechanical Engineering Modelling – Budapest Univ. of Technology and Econ.
2009 - 2013	BSc in Mechatronics Engineering – Budapest University of Technology and Economics

## **Research Interests**

nonlinear dynamics and control	safety-critical control	time delay systems
connected automated vehicles	robotic systems	autonomous systems

## **Research Projects**

PI:	
2024 - 2025	Safety-critical Control for Collision-free Navigation in Complex Environments
	Wichita State University – NASA JPL, Kansas NASA EPSCoR Program, 9 months
Co-PI:	
2024	Battery Management Through Safety-critical Control
	Wichita State University, MURPA Program, 4 months
Participation a	s researcher:
2022 - 2023	Safety-Critical Control of Fixed-Wing Aircraft
	Air Force Research Laboratory – NodeIn – California Institute of Technology
2020 - 2023	Distillation Column Inspection by Legged Robots
	Dow Chemical – NASA JPL – California Institute of Technology
2020 - 2022	Obstacle Avoidance and Control of Flying Robots
	Aerovironment – California Institute of Technology
2020 - 2022	Model Predictive Control for Connected Automated Vehicles
	Clemson University – University of Michigan
2020	Safety-Critical Control in Epidemiology
	California Institute of Technology – University of Michigan
2020	Traffic Forecasting with Neural Networks
	Northeastern University – UC San Diego – University of Michigan
2020	Cellular V2X Infrastructure Deployment on Highways
	Center for Connected and Automated Transportation – University of Michigan

<ul> <li>Navistar – University of Michigan</li> <li>2019 – 2020 Cooperative Perception for Connected Vehicles         <ul> <li>Toyota InfoTechnology Center – University of Michigan</li> </ul> </li> <li>2018 – 2020 Traffic Forecasting for Connected Vehicles         <ul> <li>Ford Research and Innovation Center – University of Michigan</li> </ul> </li> <li>2015 – 2018 Dynamics and Stability of Machine Tool Vibrations         <ul> <li>Budapest University of Technology and Economics, ERC Advanced Gran</li> </ul> </li> </ul>	2019 - 2020	Energy-Efficient Control of Connected Heavy-Duty Vehicles
<ul> <li>2019 – 2020 Cooperative Perception for Connected Vehicles         <ul> <li>Toyota InfoTechnology Center – University of Michigan</li> </ul> </li> <li>2018 – 2020 Traffic Forecasting for Connected Vehicles         <ul> <li>Ford Research and Innovation Center – University of Michigan</li> </ul> </li> <li>2015 – 2018 Dynamics and Stability of Machine Tool Vibrations         <ul> <li>Budapest University of Technology and Economics, ERC Advanced Gran</li> </ul> </li> </ul>		Navistar – University of Michigan
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Budapest University of Technology and Economics, ERC Advanced Gran	2015 - 2018	Dynamics and Stability of Machine Tool Vibrations
		Budapest University of Technology and Economics, ERC Advanced Grant

## Memberships

2025 -	Member of the IEEE Intelligent Transportation Systems Society (IEEE-ITSS)
2021 -	Member of the IEEE Control Systems Society (IEEE-CSS)

## Organization

## Co-program editor:

17th IFAC Workshop on Time Delay Systems (September 27-30, 2022, Montreal, Canada)

## Minisymposium organizer:

*Time Delays in Vehicle and Traffic Systems* 17th IFAC Workshop on Time Delay Systems (September 27-30, 2022, Montreal, Canada)

Safety of Time Delay Systems 16th IFAC Workshop on Time Delay Systems (September 29-October 1, 2021, Guangzhou, China)

## Open invited track organizer:

Dynamics, Stability, and Control of Systems with Time Delays; Theory, Scientific Computation, and Applications 22nd IFAC World Congress (July 9-14, 2023, Yokohama, Japan)

## Technical team member:

40th Southern California Control Workshop (October 21, 2022, Pasadena, CA, USA)
3rd IAVSD Workshop on Dynamics of Road Vehicles: Connected and Automated Vehicles (April 28-30, 2019, Ann Arbor, MI, USA)
14th IFAC Workshop on Time Delay Systems (June 28-30, 2018, Budapest, Hungary)

8th CIRP Conference on High Performance Cutting (June 25-27, 2018, Budapest, Hungary)

9th European Nonlinear Dynamics Conference (June 25-30, 2017, Budapest, Hungary)

## Website development:

IFAC Working Group on Time Delay Systems (2021 – ) [link]

## **Peer Review and Editor Work**

# International Program Committee member (associate editor):

17th IFAC Workshop on Time Delay Systems (September 27-30, 2022, Montreal, Canada)

## Reviews:

reviewed over 100 journal or conference proceedings publications, including:

IEEE Transactions on Automatic Control, Automatica, Annual Reviews in Control, IEEE Control Systems Letters, Transportation Research Part C, IEEE Transactions on Intelligent Transportation Systems, Nonlinear Dynamics, IFAC Workshop on Time Delay Systems, IEEE Conference on Decision and Control, American Control Conference

Teaching						
Courses taught:						
Undergraduate courses @ W	ichita S	State Unive	ersity:			
Dynamics for Mechanical Engineers Mechanical Control Systems		ngineers	ME 335         spring 2024, summer 2024           ME 659         fall 2024		ummer 2024	
Recitations for graduate stud	lents @	Universit	v of Michigan.	Ann Arbor:		
Dumonios on d Contro	1 of Co	nun onto d V		/E500/CEE501/D	OD500//SD500	
Dynamics and Contro		nnected v	enicies N	/IE399/CEE301/K	OB599/ISD599   spring 2019	
Course material preparation	@ Univ	versity of N	Michigan, Ann	Arbor:		
Dynamics and Control	ol of Co	nnected V	ehicles C	CCET online cours	se summer 2019	
Recitations for undergraduat	e stude	nts @ Bua	lapest Univers	ity of Technology	and Economics:	
Statics		BMEGEN	MMBXM1	fall 2017		
Strength of Materials		BMEGEMMAGM2 BMEGEMMBXM2 fall 2015, sp		fall 2015, spring	ng 2017, spring 2018	
Dynamics		BMEGEN	MMAGM3	spring 2015, fal	l 2015, fall 2016	
Vibrations		BMEGEN	MMAGM4	spring 2016		
Finite Element Analy	sis	BMEGEMMAGM5 spring 2015, fa BMEGEMMAGMV fall 2016, sprin		spring 2015, fal fall 2016, spring	l 2015, spring 2016, g 2018	
Supervised students:	I		I			
Laszlo Gacsi	PhD i	n ME	fall 2024 –		Wichita State University	
Aaditya Acharya	MSc i	n ME	fall 2024 -		Wichita State University	
Kolade Oke	MSc i	n EE	summer 2024		Wichita State University	
Calla Unruh	BSc in	n ME	fall 2024		Wichita State University	
Avery Thomas	BSc in	n ME	fall 2024		Wichita State University	
Mentored students:						
David van Wijk	PhD i	n ME	summer 2024	. —	Texas A&M	
Yuchen Chen	PhD i	n ME	spring 2023 -		University of Michigan, Ann Arbor	
Gilbert Bahati	PhD i	n ME	spring 2023 -	summer 2023	California Institute of Technology	
Anil Alan	PhD i	n ME	fall 2021 - sp	ring 2024	University of Michigan, Ann Arbor	
Ryan Cosner	PhD i	n ME	fall 2020 - sp	ring 2022	California Institute of Technology	
Wyatt Ubellacker	PhD i	n ME	fall 2020 - sp	ring 2022	California Institute of Technology	
Andrew Singletary PhI		n ME	fall 2020 - sp	ring 2022	California Institute of Technology	
Minghao Shen PhI		n ME	fall 2019 - fal	11 2020	University of Michigan, Ann Arbor	
Hao Wang PhI		n ME	spring 2019 -	summer 2020	University of Michigan, Ann Arbor	
Sicong Guo	MSc i	n ME	summer 2021	- summer 2022	University of Michigan, Ann Arbor	
Anand Singh N		n ME	summer 2020	- fall 2020	University of Michigan, Ann Arbor	
Xunbi Ji		n ME	summer 2019	- fall 2020	University of Michigan, Ann Arbor	
Chin-Wei Lin M		n ROB	summer 2019	- summer 2020	University of Michigan, Ann Arbor	
Johaan Chacko Matthew N		n ME	summer 2019	– fall 2019	University of Michigan, Ann Arbor	
John Yu	BSc ii	n ME	fall 2022 <b>RISE Best Pa</b>	per Award	University of Michigan, Ann Arbor	
Lejun Jiang	BSc in	n ME	summer 2019	– summer 2021	University of Michigan, Ann Arbor	
Adam Farkas	BSc in ME		fall 2017		Budapest Univ. of Tech. and Econ.	

#### Awards and Scholarships

2019	Scholarship of the Rosztoczy Foundation – 12 months
2018	Hungarian National Eötvös Scholarship – 4 months
2018	Excellent Teacher of the Faculty of Mechanical Engineering Award
2017 fall	3rd Best Teacher of the University (student education quality survey)
2017 spring	2nd Best Teacher of the University (student education quality survey)
2016 - 2017	Scholarship of the New National Excellence Program – 10 months
2016 spring	2nd Best Teacher of the University (student education quality survey)
2015	2nd Prize at the National Scientific Conference of Students
2014	Scholarship of the Budapest University of Technology and Economics
2014	Scholarship of the Faculty of Mechanical Engineering – 2 times
2013 - 2014	Distinguished Scholarship of the Hungarian Republic – 2 times
2013	1st and 2nd Prize at the Scientific Conference of Students and
	Distinguished Prize of the Pro Progressio Foundation

#### **Publications**

#### Metrics:

Cumulative impact factor: 143.10

Web of Science: citations: 568, h-index: 15

Google Scholar: citations: 1238, h-index: 20

#### Book:

[B01] Orosz G, Molnár TG, Dynamics and Control of Connected Vehicles, Springer, New York. Contracted, expected to be published in 2025.

#### Journal papers:

- [J34] Molnar TG, Kannan SK, Cunningham J, Dunlap K, Hobbs KL, Ames AD, Collision Avoidance and Geofencing for Fixedwing Aircraft with Control Barrier Functions, *IEEE Transactions on Control System Technology*, submitted (2024). [arXiv]
- [J33] Molnar TG, Orosz G, Destroying Phantom Jams with Connectivity and Automation: Nonlinear Dynamics and Control of Mixed Traffic, *Transportation Science*, published online (2024). [DOI]
- [J32] Cohen MH, Molnar TG, Ames AD, Safety-critical control for autonomous systems: Control barrier functions via reducedorder models, *Annual Reviews in Control*, **57**:100947 (2024). [DOI]
- [J31] Alan A, He CR, Molnar TG, Mathew JC, Bell AH, Orosz G, Integrating Safety with Performance in Connected Automated Truck Control: Experimental Validation, *IEEE Transactions on Intelligent Vehicles*, 9(1):3075-3088 (2024). [DOI]
- [J30] Shen M, Dollar RA, Molnar TG, He CR, Vahidi A, Orosz G, Energy-Efficient Reactive and Predictive Connected Cruise Control, *IEEE Transactions on Intelligent Vehicles*, 9(1):944-957 (2024). [DOI]
- [J29] Allen LI, Molnár TG, Dombóvári Z, Hogan SJ, The Effects of Delay on the HKB Model of Human Motor Coordination, SIAM Journal on Applied Dynamical Systems, 23(1):1-25 (2024). [DOI]
- [J28] Molnar TG, Ames AD, Composing Control Barrier Functions for Complex Safety Specifications, IEEE Control Systems Letters, 7:3615-3620 (2023). [DOI]
- [J27] Guo S, Orosz G, Molnar TG, Connected Cruise and Traffic Control for Pairs of Connected Automated Vehicles, IEEE Transactions on Intelligent Transportation Systems, 24(11):12648-12658 (2023). [DOI]
- [J26] Kiss AK, Molnar TG, Ames AD, Orosz G, Control Barrier Functionals: Safety-critical Control for Time Delay Systems, *International Journal of Robust and Nonlinear Control*, **33**(12):7282-7309 (2023). [DOI]
- [J25] Zhao C, Yu H, Molnar TG, Safety-critical traffic control by connected automated vehicles, *Transportation Research Part C: Emerging Technologies*, 154:104230 (2023). [DOI]
- [J24] Alan A, Molnar TG, Ames AD, Orosz G, Parameterized Barrier Functions to Guarantee Safety Under Uncertainty, IEEE Control Systems Letters, 7:2077-2082 (2023). [DOI]
- [J23] Molnar TG, Kiss AK, Ames AD, Orosz G, Safety-Critical Control With Input Delay in Dynamic Environment, IEEE Transactions on Control Systems Technology, 31(4):1507-1520 (2023). [DOI]
- [J22] Molnar TG, Tighe K, Ubellacker W, Kalantari A, Ames AD, Mechanical Design, Planning, and Control for Legged Robots in Distillation Columns, *Journal of Computational and Nonlinear Dynamics*, 18(6):061001 (2023). [DOI]

- [J21] Shen M, He CR, Molnar TG, Bell AH, Orosz G, Energy-efficient Connected Cruise Control with Lean Penetration of Connected Vehicles, *IEEE Transactions on Intelligent Transportation Systems*, 24(4):4320-4332 (2023). [DOI]
- [J20] Alan A, Molnar TG, Das E, Ames AD, Orosz G, Disturbance Observers for Robust Safety-critical Control with Control Barrier Functions, *IEEE Control Systems Letters*, 7:1123-1128 (2023). Winner of the ACC 2023 Best Student Paper Award of the Automotive and Transportation Systems Technical Committee. [DOI]
- [J19] Wang HM, Avedisov SS, Molnár TG, Sakr AH, Altintas O, Orosz G, Conflict Analysis for Cooperative Maneuvering with Status and Intent Sharing via V2X Communication, *IEEE Transactions on Intelligent Vehicles*, 8(2):1105-1118 (2023). [DOI]
- [J18] Singletary A, Guffey W, Molnar TG, Sinnet R, Ames AD, Safety-Critical Manipulation for Collision-Free Food Preparation, IEEE Robotics and Automation Letters, 7(4):10954-10961 (2022). Finalist in the IROS 2022 Best Paper Award for Industrial Robotics Research for Applications. [DOI]
- [J17] Molnar TG, Cosner RK, Singletary AW, Ubellacker W, Ames AD, Model-Free Safety-Critical Control for Robotic Systems, *IEEE Robotics and Automation Letters*, 7(2):944-951 (2022). [DOI]
- [J16] Jiang L, Molnár TG, Orosz G, On the deployment of V2X roadside units for traffic prediction, *Transportation Research Part C: Emerging Technologies*, **129**:103238 (2021). [DOI]
- [J15] Molnár TG, Upadhyay D, Hopka M, Van Nieuwstadt M, Orosz G, Delayed Lagrangian Continuum Models for On-Board Traffic Prediction, *Transportation Research Part C: Emerging Technologies*, **123**:102991 (2021). [DOI]
- [J14] Molnár TG, Singletary AW, Orosz G, Ames AD, Safety-Critical Control of Compartmental Epidemiological Models With Measurement Delays, *IEEE Control Systems Letters*, 5(5):1537-1542 (2021). [DOI]
- [J13] Ames AD, Molnár TG, Singletary AW, Orosz G, Safety-Critical Control of Active Interventions for COVID-19 Mitigation, IEEE Access, 8:188454-188474 (2020). [DOI]
- [J12] Dombovari Z, Iglesias A, Molnar TG, Habib G, Munoa J, Kuske R, Stepan G, Experimental observations on unsafe zones in milling processes, *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 377(2153): 20180125 (2019). [DOI]
- [J11] Molnar TG, Berezvai Sz, Kiss AK, Bachrathy D, Stepan G, Experimental investigation of dynamic chip formation in orthogonal cutting, *International Journal of Machine Tools and Manufacture*, 145:103429 (2019). [DOI]
- [J10] Molnar TG, Insperger T, Stepan G, Closed-form estimations of the bistable region in metal cutting via the method of averaging, *International Journal of Non-Linear Mechanics*, **112**:49-56 (2019). [DOI]
- [J09] Molnar TG, Dombovari Z, Insperger T, Stepan G, Bifurcation analysis of nonlinear time-periodic time-delay systems via semidiscretization, *International Journal for Numerical Methods in Engineering*, **115**(1):57-74 (2018). [DOI]
- [J08] Molnár TG, Qin WB, Insperger T, Orosz G, Application of predictor feedback to compensate time delays in connected cruise control, *IEEE Transactions on Intelligent Transportation Systems*, **19**(2):545-559 (2018). [DOI]
- [J07] Molnar TG, Dombovari Z, Insperger T, Stepan G, On the analysis of the double Hopf bifurcation in machining processes via centre manifold reduction, *Proceedings of the Royal Society A - Mathematical Physical and Engineering Sciences*, 473(2207):20170502 (2017). [DOI]
- [J06] Molnár TG, Insperger T, Bachrathy D, Stépán G, Extension of process damping to milling with low radial immersion, International Journal of Advanced Manufacturing Technology, **89**(9):2545-2556 (2017). [DOI]
- [J05] Molnár TG, Insperger T, Stépán G, Analytical estimations of limit cycle amplitude for delay-differential equations, *Electronic Journal of Qualitative Theory of Differential Equations*, **2016**(77):1-10 (2016). [DOI]
- [J04] Molnar TG, Insperger T, On the robust stabilizability of unstable systems with feedback delay by finite spectrum assignment, *Journal of Vibration and Control*, **22**(3):649-661 (2016). [DOI]
- [J03] Molnár TG, Insperger T, Hogan SJ, Stépán G, Estimation of the bistable zone for machining operations for the case of a distributed cutting-force model, *Journal of Computational and Nonlinear Dynamics*, **11**(5):051008 (2016). [DOI]
- [J02] Molnár TG, Insperger T, Stépán G, State-dependent distributed-delay model of orthogonal cutting, *Nonlinear Dynamics*, **84**(3):1147-1156 (2016). [DOI]
- [J01] Molnár TG, Insperger T, On the effect of distributed regenerative delay on the stability lobe diagrams of milling processes, *Periodica Polytechnica Mechanical Engineering*, **59**(3):126-136 (2015). [DOI]

#### **Book chapters:**

- [C02] Molnár TG, Hopka M, Upadhyay D, Van Nieuwstadt M, Orosz G, Virtual Rings on Highways: Traffic Control by Connected Automated Vehicles, In *AI-enabled Technologies for Autonomous and Connected Vehicles* (eds. Murphey YL, Kolmanovsky I, and Watta P), Springer, 441-479 (2022). [DOI]
- [C01] Molnar TG, Hajdu D, Insperger T, The Smith predictor, the modified Smith predictor and the finite spectrum assignment: A comparative study, In *Stability, control and application of time-delay systems* (eds. Gao Q and Karimi HR), Elsevier, 209-226 (2019). [DOI]

#### Conference proceedings:

- [P34] Chen Y, Orosz G, Molnar TG, Safety-Critical Connected Cruise Control: Leveraging Connectivity for Safe and Efficient Longitudinal Control of Automated Vehicles, 27th IEEE International Conference on Intelligent Transportation Systems (ITSC 2024), September 24- 27, 2024, Edmonton, Canada.
- [P33] Zhao C, Molnar TG, Yu H, Safety-Critical Stabilization of Mixed Traffic by Pairs of CAVs, American Control Conference (ACC 2024), July 8-12, 2024, Toronto, Canada, 743-748. [DOI]
- [P32] Janwani NC, Das E, Touma T, Wei SX, Molnar TG, Burdick JW, A Learning-Based Framework for Safe Human-Robot Collaboration with Multiple Backup Control Barrier Functions, *IEEE International Conference on Robotics and Automation* (ICRA 2024), May 13-17, 2024, Yokohama, Japan, 11676-11682. [DOI]
- [P31] Lee J, Kim J, Ubellacker W, Molnar TG, Ames AD, Safety-Critical Control of Quadrupedal Robots with Rolling Arms for Autonomous Inspection of Complex Environments, *IEEE International Conference on Robotics and Automation (ICRA* 2024), May 13-17, 2024, Yokohama, Japan, 3485-3491. [DOI]
- [P30] Molnar TG, Orosz G, Ames AD, On the Safety of Connected Cruise Control: Analysis and Synthesis with Control Barrier Functions, 62nd IEEE Conference on Decision and Control (CDC 2023), December 13-15, 2023, Singapore, 1106-1111. [DOI]
- [P29] Molnar TG, Ames AD, Safety-Critical Control with Bounded Inputs via Reduced Order Models, American Control Conference (ACC 2023), May 31-June 2, 2023, San Diego, CA, USA, 1414-1421. [DOI]
- [P28] Taylor AJ, Ong P, Molnar TG, Ames AD, Safe Backstepping with Control Barrier Functions, 61st IEEE Conference on Decision and Control (CDC 2022), December 6-9, 2022, Cancun, Mexico, 5775-5782. [DOI]
- [P27] Molnar TG, Alan A, Kiss AK, Ames AD, Orosz G, Input-to-State Safety with Input Delay in Longitudinal Vehicle Control, 17th IFAC Workshop on Time Delay Systems (TDS 2022), September 27-30, 2022, Montreal, Canada, IFAC-PapersOnLine 55(36):312-317 (2022). [DOI]
- [P26] Cosner RK, Tucker M, Taylor AJ, Li K, Molnar TG, Ubellacker W, Alan A, Orosz G, Yue Y, Ames AD, Safety-Aware Preference-Based Learning for Safety-Critical Control, 4th Conference on Learning for Dynamics and Control (L4DC 2022), June 23-24, 2022, Palo Alto, CA, USA, Proceedings of Machine Learning Research 168:1020-1033 (2022). [link]
- [P25] Molnár TG, Ji XA, Oh S, Takács D, Hopka M, Upadhyay D, Van Nieuwstadt M, Orosz G, On-Board Traffic Prediction for Connected Vehicles: Implementation and Experiments on Highways, *American Control Conference (ACC 2022)*, June 8-10, 2022, Atlanta, GA, USA, 1036-1041. [DOI]
- [P24] Cosner RK, Jimenez Rodriguez ID, Molnar TG, Ubellacker W, Yue Y, Ames AD, Bouman KL, Self-Supervised Online Learning for Safety-Critical Control using Stereo Vision, *IEEE International Conference on Robotics and Automation* (ICRA 2022), May 23-27, 2022, Philadelphia, PA, USA, 11487-11493. [DOI]
- [P23] Ubellacker W, Csomay-Shanklin N, Molnar TG, Ames AD, Verifying Safe Transitions between Dynamic Motion Primitives on Legged Robots, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021)*, September 27-October 1, Online (Prague, Czech Republic), 8477-8484. [DOI]
- [P22] Cosner RK, Singletary AW, Taylor AJ, Molnar TG, Bouman KL, Ames AD, Measurement-Robust Control Barrier Functions: Certainty in Safety with Uncertainty in State, *IEEE/RSJ International Conference on Intelligent Robots and* Systems (IROS 2021), September 27-October 1, Online (Prague, Czech Republic), 6286-6291. [DOI]
- [P21] Ji XA, Molnár TG, Gorodetsky AA, Orosz G, Bayesian Inference for Time Delay Systems with Application to Connected Automated Vehicles, 24th IEEE International Conference on Intelligent Transportation Systems (ITSC 2021), September 19-22, 2021, Indianapolis, IN, USA, 3259-3264. [DOI]
- [P20] Ji XA, Molnár TG, Avedisov SS, Orosz G, Learning the Dynamics of Time Delay Systems with Trainable Delays, 3rd Conference on Learning for Dynamics and Control (L4DC 2021), June 7-8, 2021, Online (Zurich, Switzerland), Proceedings of Machine Learning Research 144:930-942 (2021). [link]
- [P19] Wong S, Jiang L, Walters R, Molnár TG, Orosz G, Yu R, Traffic Forecasting using Vehicle-to-Vehicle Communication, 3rd Conference on Learning for Dynamics and Control (L4DC 2021), June 7-8, 2021, Online (Zurich, Switzerland), Proceedings of Machine Learning Research 144:917-929 (2021). [link]
- [P18] Kiss AK, Molnar TG, Bachrathy D, Ames AD, Orosz G, Certifying Safety for Nonlinear Time Delay Systems via Safety Functionals: A Discretization Based Approach, American Control Conference (ACC 2021), May 25-28, 2021, Online (New Orleans, LA, USA), 1055-1060. [DOI]
- [P17] Shen M, Molnár TG, He CR, Bell AH, Hunkler M, Oppermann D, Zukouski R, Yan J, Orosz G, Saving Energy with Delayed Information in Connected Vehicle Systems, *American Control Conference (ACC 2021)*, May 25-28, 2021, Online (New Orleans, LA, USA), 1621-1626. [DOI]
- [P16] Dollar RA, Molnár TG, Vahidi A, Orosz G, MPC-Based Connected Cruise Control with Multiple Human Predecessors, American Control Conference (ACC 2021), May 25-28, 2021, Online (New Orleans, LA, USA), 404-410. [DOI]
- [P15] Avedisov SS, Lin C-W, Molnár TG, Altintas O, Sakr AH, Orosz G, Perceived Safety: A New Metric for Evaluating Safety Benefits of Collective Perception for Connected Road Users, *IEEE Vehicular Networking Conference (VNC 2020)*, December 16-18, 2020, Online (New York, NY, USA), 1-4. [DOI]

- [P14] Molnár TG, Upadhyay D, Hopka M, Van Nieuwstadt M, Orosz G, Open and closed loop traffic control by connected automated vehicles, 59th IEEE Conference on Decision and Control (CDC 2020), December 14-18, 2020, Online (Jeju Island, Republic of Korea), 239-244. [DOI]
- [P13] Wang HM, Molnár TG, Avedisov SS, Sakr AH, Altintas O, Orosz G, Conflict Analysis for Cooperative Merging Using V2X Communication, 31st IEEE Intelligent Vehicles Symposium (IEEE IV 2020), October 20-23, 2020, Online (Las Vegas, NV, USA), 1538-1543. [DOI]
- [P12] He CR, Alan A, Molnár TG, Avedisov SS, Bell AH, Zukouski R, Hunkler M, Yan J, Orosz G, Improving fuel economy of heavy-duty vehicles in daily driving, *American Control Conference (ACC 2020)*, July 1-3, 2020, Online (Denver, CO, USA), 2306-2311. [DOI]
- [P11] Ji XA, Avedisov SS, Molnár TG, Orosz G, Feed-forward neural network with trainable delay, 2nd Conference on Learning for Dynamics and Control (L4DC 2020), June 11-12, 2020, Online (Berkeley, California, USA), Proceedings of Machine Learning Research 120:127-136 (2020). [link]
- [P10] Molnár TG, Upadhyay D, Hopka M, Van Nieuwstadt M, Orosz G, Lagrangian models for controlling large-scale heterogeneous traffic, 58th IEEE Conference on Decision and Control (CDC 2019), December 11-13, 2019, Nice, France, 3152-3157. [DOI]
- [P09] Berezvai Sz, Molnar TG, Kossa A, Bachrathy D, Stepan G, Numerical and experimental investigation of contact length during orthogonal cutting, 35th Danubia Adria Symposium on Advances in Experimental Mechanics (DAS 2018), September 25-28, 2018, Sinaia, Romania, Materials Today: Proceedings, 12(2):329-334 (2019). [DOI]
- [P08] Molnar TG, Bachrathy D, Insperger T, Stepan G, On process damping induced by vibration-dependency of cutting direction in milling, 8th CIRP Conference on High Performance Cutting (HPC 2018), June 25-27, 2018, Budapest, Hungary, Procedia CIRP 77:171-174 (2018). [DOI]
- [P07] Berezvai Sz, Molnar TG, Bachrathy D, Stepan G, Experimental investigation of the shear angle variation during orthogonal cutting, 34th Danubia Adria Symposium on Advances in Experimental Mechanics (DAS 2017), September 19-22, 2017, Trieste, Italy, Materials Today: Proceedings 5(13):26495–26500 (2018). [DOI]
- [P06] Miklos A, Takacs D, Wohlfart R, Porempovics G, Molnar TG, Bachrathy D, Toth A, Stepan G, The development of high speed virtual milling test, ASME 2017 Dynamic Systems and Control Conference (DSCC 2017), October 11-13, 2017, Tysons, VA, USA, DSCC2017-5217, pp. V002T16A003. [DOI]
- [P05] Molnár TG, Dombóvári Z, Insperger T, Stépán G, Dynamics of cutting near double Hopf bifurcation, IUTAM Symposium on Nonlinear and Delayed Dynamics of Mechatronic Systems (IUTAM 2016), October 17-21, 2016, Nanjing, China, Procedia IUTAM 22:123-130 (2017). [DOI]
- [P04] Molnár TG, Insperger T, Stépán G, Estimation of safe chatter-free technological parameter regions for machining operations, 7th CIRP Conference on High Performance Cutting (HPC 2016), May 31-June 2, 2016, Chemnitz, Germany, Procedia CIRP 46:464-467 (2016). [DOI]
- [P03] Molnár TG, Insperger T, Hogan SJ, Stépán G, Investigating multiscale phenomena in machining: the effect of cutting-force distribution along the tool's rake face on process stability, ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2015), August 2-5, 2015, Boston, MA, USA, DETC2015-47165, pp. V006T10A063. [DOI]
- [P02] Molnár TG, Qin WB, Insperger T, Orosz G, Predictor design for connected cruise control subject to packet loss, 12th IFAC Workshop on Time Delay Systems (TDS 2015), June 28-30, 2015, Ann Arbor, MI, USA, IFAC-PapersOnLine 48(12):428-433 (2015). [DOI]
- [P01] Molnár TG, Insperger T, On the stabilizability of the delayed inverted pendulum controlled by finite spectrum assignment in case of parameter uncertainties, ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2013), August 4-7, 2013, Portland, OR, USA, DETC2013-12316, pp. V07BT10A059. [DOI]

#### Theme issue:

[T01] Proceeding of the 17th IFAC Workshop on Time Delay Systems. IFAC-PapersOnLine, 55(36):1-318 (2022). Editors: Conte G, Molnar T. [link]

#### Patents:

- [I02] Ames AD, Singletary AW, Molnar TG, Systems and Methods for Model-free Safety Control in Robotics Platforms, US Patent, April 7, 2023, Application No. 18/297,525.
- [I01] Ames AD, Singletary AW, Molnar TG, Model-Free Safety Regulator, US Patent, April 7, 2022, Application No. 63/328,582.

#### Presentations

#### Invited seminars:

- [16] *Guaranteeing Safety in Real-world Control Systems: from Robots to Automated Vehicles,* Nanjing University of Astronautics and Aeronautics, May 27, 2024, Nanjing, China.
- [15] *Guaranteeing Safety in Real-world Control Systems: from Robots to Automated Vehicles,* Southeast University, May 23, 2024, Nanjing, China.
- [14] *Guaranteeing Safe Dynamic Behavior: from Robotic Systems to Automated Vehicles*, Budapest University of Technology and Economics, December 19, 2023, Budapest, Hungary.
- [13] *Guaranteeing Safe Behavior in Control Systems: from Robots to Connected Vehicles*, Toyota InfoTech Labs, November 22, 2023, Online (Mountain View, CA, USA).
- [12] *Guaranteeing Safe Behavior for Real-World Control Systems*, Wichita State University, September 29, 2023, Wichita, KS, USA.
- [11] *Traffic Prediction and Traffic Control with Connected Automated Vehicles*, University of Michigan, April 13, 2023, Ann Arbor, MI, USA.
- [10] Safety-critical Control by Control Barrier Functions and Reduced Order Models, Carnegie Mellon University, November 7, 2022, Online (Pittsburgh, PA, USA).
- [09] *Safety-critical Control with Control Barrier Functions*, Air Force Research Laboratory and NodeIn, April 4, 2022, Online.
- [08] Vehicle-to-Everything Connectivity in Traffic Modeling, Prediction and Control, The Hong Kong University of Science and Technology, October 25, 2021, Online (Hong Kong).
- [07] *Traffic Prediction and Control Using V2X Connectivity*, University of Michigan, October 21, 2021, Online (Ann Arbor, MI, USA).
- [06] On-Board Traffic Forecasting Using V2X Connectivity, Ford Research and Innovation Center, December 8, 2020, Online (Dearborn, MI, USA).
- [05] *Continuum traffic flow models for applications of connected vehicles*, University of California San Diego, February 10, 2020, San Diego, CA, USA.
- [04] *Exploiting connectivity by infinite-dimensional traffic flow models*, California Institute of Technology, October 4, 2019, Pasadena, CA, USA.
- [03] *Utilization of V2V communication in modeling and prediction of traffic behavior*, Ford Research and Innovation Center, December 11, 2018, Dearborn, MI, USA.
- [02] Application of predictor feedback to compensate time delays in connected cruise control, University of Michigan, February 3, 2017, Online (Ann Arbor, MI, USA).
- [01] On the stabilizability of the delayed inverted pendulum controlled by Finite Spectrum Assignment in case of parameter uncertainties,

University of Michigan, July 16, 2013, Ann Arbor, MI, USA.

#### Conference talks:

- [26] *Mitigating Phantom Jams by Connected Automated Vehicles in Mixed Traffic*, 18th IFAC Workshop on Time Delay Systems, September 24-27, 2024, Udine, Italy.
- [25] Destroying Phantom Jams with Connectivity and Automation: Nonlinear Dynamics and Control of Mixed Traffic, 25th International Symposium on Transportation and Traffic Theory, July 15-17, 2024, Ann Arbor, MI, USA.
- [24] *Composing Control Barrier Functions for Complex Safety Specifications*, American Control Conference, July 8-12, 2024, Toronto, ON, Canada.
- [23] Safety-Critical Control with Bounded Inputs via Reduced Order Models, American Control Conference, May 31-June 2, 2023, San Diego, CA, USA.
- [22] Safety-critical Control by Control Barrier Functions and Reduced Order Models, 40th Southern California Control Workshop, October 21, 2022, Pasadena, CA, USA.
- [21] On-Board Traffic Prediction for Connected Vehicles: Implementation and Experiments on Highways, American Control Conference, June 8-10, 2022, Atlanta, GA, USA.
- [20] *Model-Free Safety-Critical Control for Robotic Systems*, IEEE International Conference on Robotics and Automation, May 23-27, 2022, Philadelphia, PA, USA.
- [19] Synthesizing Safety-Critical Controllers for Systems with Input Delay,
   16th IFAC Workshop on Time Delay Systems, September 29-October 1, 2021, Online (Guangzhou, China).
- [18] On-board Traffic Prediction Via V2X Connectivity, International Symposium on Transportation Data and Modelling, June 21-24, 2021, Online (Ann Arbor, MI, USA).

- [17] Safety-Critical Control of Compartmental Epidemiological Models with Measurement Delays, American Control Conference, May 25-28, 2021, Online (New Orleans, LA, USA).
- [16] Open and closed loop traffic control by connected automated vehicles,
   59th IEEE Conference on Decision and Control, December 14-18, 2020, Online (Jeju Island, Republic of Korea).
- [15] Lagrangian models for controlling large-scale heterogeneous traffic,
   58th IEEE Conference on Decision and Control, December 11-13, 2019, Nice, France.
- [14] *Time delay models of vehicular traffic and their comparison to microscopic traffic data*, SIAM Conference on Applications of Dynamical Systems, May 19-23, 2019, Snowbird, UT, USA.
- [13] Semidiscretization method for nonlinear time-periodic time-delay systems, IUTAM Symposium on Exploiting Nonlinear Dynamics for Engineering Systems, July 15-19, 2018, Novi Sad, Serbia.
- [12] On process damping induced by vibration-dependency of cutting direction in milling, 8th CIRP Conference on High Performance Cutting, June 25-27, 2018, Budapest, Hungary.
- [11] Finding periodic solutions in the dynamics of metal cutting via averaging,
   9th European Nonlinear Dynamics Conference, June 25-30, 2017, Budapest, Hungary.
- [10] Analytical results in nonlinear dynamics of turning, SIAM Conference on Applications of Dynamical Systems, May 21-25, 2017, Snowbird, UT, USA.
- [09] Double Hopf bifurcation in orthogonal cutting processes, IUTAM Symposium on Nonlinear and Delayed Dynamics of Mechatronic Systems, October 17-21, 2016, Nanjing, China.
- [08] Higher-order estimation of limit cycle amplitude in metal cutting,
   24th International Congress of Theoretical and Applied Mechanics August 21-26, 2016, Montréal, Canada.
- [07] *Estimation of safe chatter-free technological parameter regions for machining operations*, 7th CIRP Conference on High Performance Cutting, May 31-June 2, 2016, Chemnitz, Germany.
- [06] *Higher-order estimation of the amplitude of regenerative vibrations in metal cutting*, Conference on Open Problems in Nonsmooth Dynamics, February 1-5, 2016, Bellaterra (Barcelona), Spain.
- [05] Investigating multiscale phenomena in machining: the effect of cutting-force distribution along the tool's rake face on process stability,
   ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, August 2-5, 2015, Boston, MA, USA.
- [04] Predictor design for connected cruise control subject to packet loss, 12th IFAC Workshop on Time Delay Systems, June 28-30, 2015, Ann Arbor, MI, USA.
- [03] *Stability analysis of connected vehicle platoons in case of packet loss*, 8th European Nonlinear Dynamics Conference, July 6-11, 2014, Vienna, Austria.

Conference, August 4-7, 2013, Portland, OR, USA.

- [02] On the stabilization by finite spectrum assignment in case of parameter uncertainties, VI Finno-Ugric International Conference of Mechanics, August 11-15, 2013, Ráckeve, Hungary.
- [01] On the stabilizability of the delayed inverted pendulum controlled by finite spectrum assignment in case of parameter uncertainties,
   ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering

Wichita, KS, USA October 19, 2024