

# CHANG LIU

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## ACADEMIC EMPLOYMENT

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### University of Connecticut

8/2023 - now

Assistant Professor in School of Mechanical, Aerospace, and Manufacturing Engineering

Affiliated Faculty in Center for Clean Energy Engineering (C2E2)

Affiliated Faculty in Connecticut Institute for Resilience and Climate Adaptation (CIRCA)

### Woods Hole Oceanographic Institution

06/2024 - 07/2024

Staff Member of Geophysical Fluid Dynamics Program

### University of California, Berkeley

8/2021 - 7/2023

Postdoctoral Scholar - Employee in Department of Physics (Advisor: Edgar Knobloch)

## EDUCATION

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### Johns Hopkins University

8/2017 - 8/2021

Ph.D. in Mechanical Engineering (Advisor: Dennice F. Gayme)

8/2021

Dissertation title: Feedback interconnection based input-output analysis of spatio-temporal response in wall-bounded shear flows (committees: C. P. Caulfield, C. Meneveau and D. F. Gayme)

M.S.E. in Applied Mathematics and Statistics

5/2021

M.S.E. in Mechanical Engineering

8/2020

### Shanghai Jiao Tong University

9/2013 - 7/2017

B.E. in Naval Architecture and Ocean Engineering (Advisor: Shixiao Fu)

Bachelor Thesis: Hydrodynamics of Flexible Riser Under Vortex-induced Vibration (**Top 1% Award**)

B.E. in Computer Technology and Application (Advisor: Minyi Guo)

## EXTERNL FUNDING SUPPORT

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EF1. NASA Connecticut Space Grant Consortium Faculty Research Award P-2104 “Quantum computation of hydrodynamic stability: from aerospace to convection in the Sun” \$9993 (Sole PI) 01/2024-07/2024

EF2. Connecticut Sea Grant Professional Development Award PD-23-07 “Settling enhanced mixing in stably stratified flows” \$3312 (Sole PI) 01/2024-07/2024

EF3. IBM Quantum Credits “Quantum computation of hydrodynamic stability: from aerospace to convection in the Sun” (Sole PI) 12 hours of Qiskit runtime usage  $\approx$  \$70,000 04/2024-04/2025

EF4. National Renewable Energy Laboratory “Reduced-order modeling of fluid dynamics” (Sole PI) 150K CPU hours 10/2024-09/2025

EF5. NSF ACCESS Explore PHY240243 “Thermohaline-shear instability and its influence on ice melting in Polar regions” (Sole PI) 200K CPU hours 09/2024-09/2025

EF6. NSF ACCESS Discover PHY240029 “Role of geometry in two-dimensional fluid flows: from geophysical turbulence to inclined porous medium convection” (Co-PI) 1.5M CPU Hours  $\approx$  \$7500 01/2024-01/2025

EF7. NSF ACCESS Explore PHY230056 “Role of domain geometry in two-dimensional fluid flows: from turbulence in anisotropic domains to inclined porous medium convection” (Co-PI) 600K CPU Hours  $\approx$  \$3000 04/2023-04/2024

EF8. Travel funds to visit Woods Hole Oceanographic Institution (WHOI) for the 64th year of the Geophysical Fluid Dynamics Program \$1600 2024

EF9. Junior Researcher Grant for “Flow, Turbulence, and Wind Energy” symposium \$915.50 2023

EF10. Berkeley Postdoctoral Association Professional Development Award \$1250 2023

## INTERNAL FUNDING SUPPORT

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IF1. UConn Research Excellence Program “Nonlinear stability of time-dependent flows based on convex optimizations” \$25,000 (Sole PI) 05/2024-06/2025

IF2. UConn Quantum Innovation Seed Grants “Quantum-assisted stability analysis of unsteady flow: from aerospace to oceanography” \$49,999 (Leading PI, my share \$26,500.37) 01/2024-12/2024

IF3. AAUP/OVPR Travel Award \$2200 5/2024

IF4. Deanery funds for Professional Development on Quantum Computing \$1391.40 2023

## PENDING FUNDING SUPPORT

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PF1. RTX University Research Program “Multi-physics driven topology optimization of coldplates subject to a spatiotemporally varying surface temperature” \$100,000 (Leading PI, my share: \$50,000) 08/2025-08/2026

PF2. RTX University Research Program “Digital Twin of Transition to Turbulence Based on Physics-Informed Deep Operator Networks” \$100,000 (Co-PI, my share: \$30,000) 08/2025-07/2026

PF3. National Science Foundation “Collaborative Research: Multiscale interactions of double-diffusive layers with internal waves and shear” \$263,250 07/2025-06/2028

PF4. National Science Foundation “Collaborative Research: Uncovering Spatiotemporal Dynamics of Large-Scale Structures in Rough-wall Turbulent Flows” \$300,000 05/2025-04/2028

PF5. National Science Foundation “NSF-BSF: Competition between shear and stratification in thermally driven slope winds” \$599,881 (Leading PI, my share: \$312,660) 01/2025-12/2027

## AWARDS AND HONORS

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*Berkeley Postdoctoral Association Professional Development Award (\$1250)* 2023

*Corrsin-Kovaszny Outstanding Paper Award (\$500)* 2021

*Creel Family Teaching Assistant Award (\$500)* 2019

*Outstanding Contribution Award of Chun-Tsung Foundation* 2018

*Excellent Bachelor Thesis (Top 1%) in Shanghai Jiao Tong University* 2017

*Hongyi Scholarship (¥25,000)* 2016

*Class NK Sholarship (¥5,000)* 2016

*Chun-Tsung Scholar (¥16,000)* 2016

*Fan, Xuji Scholarship (¥10,000 per year)* 2015

*National Scholarship (¥8000)* 2014

## JOURNAL ARTICLES

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\*: corresponding author, \_\_\_: research mentee

J1. A. Rath, **C. Liu**, D. F. Gayme “The role of wall suction on optimal perturbations in transitional boundary layers: A structured approach” (In preparation)

J2. **C. Liu**, C. P. Caulfield, D. F. Gayme “Plane Couette flow with stabilizing spanwise rotation: analogy to stable stratification” (In preparation)

- J3. [Z. Li](#), [C. Liu](#), A. van Kan, E. Knobloch “Traveling spatially localized convective structures in an inclined porous medium” *Physical Review Fluids* (Under Review)
- J4. J. Liu, K. T. Tse, G. Hu, [C. Liu](#), B. Zhang, K. C. S. Kwok “Exploring aerodynamics of a rectangular cylinder using flow field and surface pressure synchronized testing technique” *Physics of Fluids* 36(8), 085174
- J5. [T. Tsubota\\*](#), [C. Liu](#), B. Foster, E. Knobloch (2024) “Bifurcation delay and front propagation in the real Ginzburg-Landau equation on a time-dependent domain” *Physical Review E* 109, 044210
- J6. [L. Xu](#), A. van Kan\*, [C. Liu](#), E. Knobloch (2024) “Fluctuation-Induced Transitions in Anisotropic Two-Dimensional Turbulence” *Physical Review Fluids* 9, 064605 (**Editors’ Suggestion**)
- J7. X. Fu, S. Fu\*, [C. Liu](#), M. Zhang, Q. Hu (2024) “Data-driven approach for modelling Reynolds stress tensor with invariance preservation” *Computers & Fluids* 274, 106215
- J8. [C. Liu\\*](#), M. Sharma, K. Julien, E. Knobloch (2024) “Fixed-flux Rayleigh-Bénard convection in doubly periodic domains: generation of large-scale shear” *Journal of Fluid Mechanics* 979, A19
- J9. [Y. Shuai\\*](#), [C. Liu](#), D. F. Gayme (2023) “Structured input-output analysis of oblique laminar-turbulent patterns in plane Couette-Poiseuille flow” *International Journal of Heat and Fluid Flow* 103, 109207 (**Invited**)
- J10. [C. Liu\\*](#), A. D. Clark (2023) “Analysing the impact of bottom friction on shallow water waves over idealised bottom topographies” *Geophysical & Astrophysical Fluid Dynamics* 117(2), 107-129
- J11. [C. Liu\\*](#), A. D. Clark (2023) “Semi-analytical solutions of shallow water waves with idealized bottom topographies” *Geophysical & Astrophysical Fluid Dynamics* 117(1), 35-58
- J12. [C. Liu\\*](#), K. Julien, E. Knobloch (2022) “Staircase solutions and stability in vertically confined salt-finger convection” *Journal of Fluid Mechanics* 952, A4
- J13. [C. Liu\\*](#), E. Knobloch\* (2022) “Single-mode solutions for convection and double-diffusive convection in porous medium” *Fluids* 7(12), 373 (**Invited, Issue Cover**)
- J14. [C. Liu\\*](#), C. P. Caulfield, D. F. Gayme (2022) “Structured input-output analysis of stably stratified plane Couette flow” *Journal of Fluid Mechanics* 948, A10
- J15. [C. Liu\\*](#), I. Gluzman, M. Lozier, S. Midya, S. Gordeyev, F. O. Thomas, D. F. Gayme (2022) “Spatial input-output analysis of actuated turbulent boundary layers” *AIAA Journal* 60(10), 6313-6327
- J16. [C. Liu\\*](#), D. F. Gayme (2021) “Structured input-output analysis of transitional wall-bounded flows” *Journal of Fluid Mechanics* 927, A25 (**Corrsin-Kovasznay Outstanding Paper Award**)
- J17. M. Zhang, S. Fu\* [C. Liu](#), H. Ren, Y. Xu\* (2021) “Experimental Investigation on Vortex-induced Force of a Steel Catenary Riser under in-plane vessel motion” *Marine Structures* 78, 102882
- J18. [C. Liu](#), D. F. Gayme\* (2020) “An input-output based analysis of convective velocity in turbulent channels” *Journal of Fluid Mechanics* 888, A32
- J19. [C. Liu\\*](#), D. F. Gayme\* (2020) “Input-output inspired method for permissible perturbation amplitude of transitional wall-bounded shear flows” *Physical Review E* 102, 063108
- J20. [C. Liu](#), S. Fu\*, M. Zhang\*, H. Ren, Y. Xu (2020) “Hydrodynamics of a flexible cylinder under modulated vortex-induced vibrations” *Journal of Fluids and Structures* 94, 102913
- J21. H. Ren, S. Fu\*, [C. Liu](#), M. Zhang, Y. Xu, S. Deng (2020) “Hydrodynamic Forces of a Semi-submerged Cylinder in an Oscillatory Flow” *Applied Sciences* 10(18), 6404

- J22. H. Ren, M. Zhang\*, J. Cheng, P. Cao, Y. Xu, S. Fu, **C. Liu**, Y. Wang (2020) “Magnification of Hydrodynamic Coefficients on a Flexible Pipe Fitted with Helical Strakes in Oscillatory Flows” *Ocean Engineering* 210, 107543
- J23. H. Ren, M. Zhang\*, J. Cheng, P. Cao, Y. Xu, S. Fu, **C. Liu** (2020) “Experimental Investigation on Vortex-induced Vibration of a Flexible Pipe under Higher Mode in an Oscillatory Flow” *Journal of Marine Science and Engineering* 8(6), 408
- J24. J. Wang, S. Fu\*, R. Baarholm, M. Zhang, **C. Liu** (2019) “Global motion reconstruction of a steel catenary riser under vessel motion” *Ship and Offshore Structures* 14(5), 442-456
- J25. **C. Liu\***, L. Dong (2019) “Stabilization of Lagrange points in circular restricted three-body problem: a port Hamiltonian approach” *Physics Letters A* 383, 1907-1914
- J26. **C. Liu\***, L. Dong (2019) “Physics-based control education: energy, dissipation and structure assignments” *European Journal of Physics* 40(3), 035006
- J27. **C. Liu**, S. Fu\*, X. Tang, M. Zhang, H. Ren (2019) “Time Varying Hydrodynamic Characteristics Identification of a Flexible Riser under Multi-frequency VIVs” *Journal of Vibration and Shock* 38(1), 149-158 (In Chinese)
- J28. **C. Liu\*** (2019) “Teaching control theory in physics: the port Hamiltonian framework” *College Physics* 38(10), 1 (In Chinese) (Outstanding paper award in 2019)
- J29. **C. Liu**, S. Fu\*, M. Zhang, H. Ren (2018) “Time-varying hydrodynamics of a flexible riser under multi-frequency vortex-induced vibrations” *Journal of Fluids and Structures* 80, 217-244

## PEER-REVIEWED CONFERENCE PROCEEDINGS

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\*: corresponding author, \_\_\_: research mentee

- C1. A. Rath, **C. Liu**, D. F. Gayme (2024) “A structured input-output approach to evaluating the effects of uniform wall-suction on optimal perturbations in transitional boundary layers” 2024 Conference on Decision and Control, Milan, Italy (Accepted)
- C2. **C. Liu\***, A. D. Clark (2024) “Error bounds of constant gain least-mean-squares algorithms” 58th Annual Conference on Information Sciences and Systems, Princeton, NJ, USA
- C3. **C. Liu\***, Y. Shuai, A. Rath, D. F. Gayme (2023) “A structured input-output approach to characterizing optimal perturbations in wall-bounded shear flows” 2023 American Control Conference (ACC), San Diego, CA, USA, pp. 2319-2325
- C4. Y. Shuai, **C. Liu**, D. F. Gayme\* (2022) “Structured input-output analysis of oblique turbulent bands in transitional plane Couette-Poiseuille flow” 12th International Symposium on Turbulence and Shear Flow Phenomena, Osaka, Japan
- C5. **C. Liu\***, I. Gluzman, M. Lozier, S. Midya, S. Gordeyev, F. O. Thomas, D. F. Gayme (2021) “Spatial input-output based modeling of large-scale structures in actuated turbulent boundary layers” AIAA Aviation Forum 2021-2873
- C6. **C. Liu**, D. F. Gayme\* (2019) “Convective velocities of vorticity fluctuations in turbulent channel flows: an input-output based approach” 11th International Symposium on Turbulence and Shear Flow Phenomena, Southampton, UK
- C7. **C. Liu**, S. Fu\*, M. Zhang, H. Ren (2017) “Time Varying Hydrodynamics Identification of a Flexible Riser under Multi-frequency Vortex-Induced Vibrations” 36th International Conference on Ocean Offshore and Arctic Engineering Paper No. OMAE2017-61261

## INVITED PRESENTATIONS

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- I1. **C. Liu** (2024) “Single-mode equations based reduced-order modeling of (double-diffusive) convection” *Geophysical Fluid Dynamics Program, Woods Hole Oceanographic Institution*, July 12, 2024
- I2. **C. Liu** (2024) “Reduced-order modeling and analysis of fluid flows: from wall-bounded shear flows to convection” *Department of Mechanical Science & Engineering, University of Illinois Urbana-Champaign*, January 25, 2024 (Virtual)
- I3. **C. Liu** (2023) “Structured input-output analysis of wall-bounded shear flows” *Pre-APSDFD23 Workshop: The intersection of experiments, machine learning, and dynamical systems approaches to turbulent/complex fluid flows in energy systems and the environment*, November 16-17, 2023, Durham, New Hampshire
- I4. **C. Liu** (2023) “Reduced-order modeling and analysis of fluid flows” *Department of Mechanical Engineering, University of Connecticut*, September 8, 2023, Storrs, Connecticut
- I5. **C. Liu** (2023) “Reduced-order modeling and analysis of fluid flows: from wall-bounded shear flows to convection” *Department of Mechanical Engineering, University of Connecticut*, February 22, 2023, Storrs, Connecticut
- I6. **C. Liu** (2022) “Structured input-output analysis of transitional wall-bounded shear flows” *Institute of Mechanics, Chinese Academy of Sciences*, August 3, 2022 (Online)
- I7. **C. Liu** (2022) “Structured input-output analysis of transitional wall-bounded flows” *Corrsin-Kovaszny Award talk in Center for Environmental & Applied Fluid Mechanics at Johns Hopkins University*, April 22, 2022, Baltimore, Maryland (**Corrsin-Kovaszny Outstanding Paper Award**)
- I8. **C. Liu**, D. F. Gayme (2021) “Structured input-output analysis of wall-parallel length scales in transitional plane Couette flow” *AIAA Aviation 2021 Forum*, August 2-6, 2021, Virtual Event

## CONTRIBUTED ORAL PRESENTATIONS

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\_\_\_: research mentee

- O1. **C. Liu** (2024) “Reduced-order modeling and analysis of fluid flows: from wall-bounded shear flows to convection” *New England Section of the American Physical Society Fall 2024 Meeting*, October 18-19, 2024, Boston, MA
- O2. **C. Liu** (2024) “Structured input-output analysis of wall-bounded shear flows” *Workshop on Coherent Structures for Turbulence Modeling*, November 20-21, 2024, Santa Fe, New Mexico
- O3. **C. Liu** (2024) “Structured input-output analysis of wall-bounded shear flows” *2024 SIAM New York-New Jersey-Pennsylvania Section Conference*, November 1-3 2024, Rochester Institute of Technology, Rochester, New York
- O4. **J. George**, **C. Liu** (2024) “Input-output analysis of transitional channel flow over large-scale wavy walls” *2024 SIAM New York-New Jersey-Pennsylvania Section Conference*, 1-3 Nov 2024, Rochester Institute of Technology, Rochester, New York
- O5. **J. George**, **C. Liu** (2024) “Input-output analysis of transitional channel flow over large-scale wavy walls” *77th Annual Meeting of the APS Division of Fluid Dynamics*, November 24-26, 2024, Salt Lake City, Utah
- O6. **A. Rath**, **C. Liu**, D. F. Gayme (2024) “Effect of wall suction on optimal perturbations in boundary layers” *77th Annual Meeting of the APS Division of Fluid Dynamics*, November 24-26, 2024, Salt Lake City, Utah
- O7. **Z. Li**, **C. Liu**, A. van Kan, E. Knobloch (2024) “Traveling spatially localized convective structures in an inclined porous medium” *77th Annual Meeting of the APS Division of Fluid Dynamics*, November 24-26, 2024, Salt Lake City, Utah

- O8. **C. Liu**, E. Knobloch (2024) “Single-mode solutions for convection and double-diffusive convection in porous media” *77th Annual Meeting of the APS Division of Fluid Dynamics*, November 24-26, 2024, Salt Lake City, Utah
- O9. **C. Liu**, Y. Zaidi (2024) “Quantum assisted hydrodynamic stability analysis” 2nd UConn Quantum Consortium, March 20, Storrs, Connecticut
- O10. **C. Liu** (2024) “Reduced-order modeling and analysis of fluid flows: from wall-bounded shear flows to convection” 98th New England Complex Fluids, March 22, Tufts University, Medford, Massachusetts
- O11. **C. Liu**, A. D. Clark (2024) “Error bounds of constant gain least-mean-squares algorithms” 58th Annual Conference on Information Sciences and Systems, March 13-15, Princeton, New Jersey
- O12. **C. Liu** (2023) “Reduced-order modeling and analysis of fluid flows: from wall-bounded shear flows to convection” Vortices, zombies and spots: A celebration of Philip Marcus’ 36 years at Berkeley and 72 years on Planet Earth, December 8-9, Berkeley, California
- O13. **C. Liu**, M. Sharma, K. Julien, E. Knobloch (2023) “Fixed-flux Rayleigh-Bénard convection in doubly periodic domains” *76th Annual Meeting of the APS Division of Fluid Dynamics*, November 19-21, 2023, Washington, DC
- O14. L. Xu, A. van Kan, **C. Liu**, E. Knobloch (2023) “Noise-induced transitions in anisotropic two-dimensional turbulence” *76th Annual Meeting of the APS Division of Fluid Dynamics*, November 19-21, 2023, Washington, DC
- O15. A. Rath, **C. Liu**, D. F. Gayme (2023) “Optimal perturbations in transitional Blasius boundary layers: A structured approach” *76th Annual Meeting of the APS Division of Fluid Dynamics*, November 19-21, 2023, Washington, DC
- O16. **C. Liu** (2023) “Reduced-order modeling and analysis of fluid flows” Cambridge-Oxford Joint Fluid Mechanics Symposium, October 29, 2023, Cambridge, UK (Virtual lightning talk)
- O17. **C. Liu** A. D. Clark (2023) “Semi-analytical solutions of shallow water waves with idealized bottom topographies” SIAM New York-New Jersey-Pennsylvania Section, October 21-22, 2023, Newark, New Jersey
- O18. **C. Liu**, Y. Shuai, A. Rath, D. F. Gayme (2023) “A structured input-output approach to characterizing optimal perturbations in wall-bounded shear flows” *American Control Conference 2023*, May 31-June 2, San Diego, California
- O19. **C. Liu** (2023) “Reduced-order modeling and analysis of fluid flows: from wall-bounded shear flows to salt-finger convection” *Climate Chedann Group*, February 25, 2023 (Online)
- O20. **C. Liu**, K. Julien, E. Knobloch (2022) “Staircase solutions and stability in vertically confined salt-finger convection” *75th Annual Meeting of the APS Division of Fluid Dynamics*, November 20-22, 2022, Indianapolis, Indiana
- O21. M. Sharma, **C. Liu**, K. Julien, E. Knobloch (2022) “Modeling salt-finger convection in the oceanic parameter regimes” *75th Annual Meeting of the APS Division of Fluid Dynamics*, November 20-22, 2022, Indianapolis, Indiana
- O22. Y. Shuai, **C. Liu**, D. F. Gayme (2022) “Structured input-output analysis of oblique laminar-turbulent flow patterns in transitional plane Couette-Poiseuille flow” *75th Annual Meeting of the APS Division of Fluid Dynamics*, November 20-22, 2022, Indianapolis, Indiana
- O23. A. Rath, **C. Liu**, D. F. Gayme (2022) “Structured input-output analysis of transitional Blasius boundary layer flows using a descriptor state space model” *75th Annual Meeting of the APS Division of Fluid Dynamics*, November 20-22, 2022, Indianapolis, Indiana

- O24. Y. Shuai, **C. Liu**, D. F. Gayme (2022) “Structured input-output analysis of oblique turbulent bands in transitional plane Couette-Poiseuille flow“ *Twelfth International Symposium on Turbulence and Shear Flow Phenomena (TSFP12)*, July 19-22, 2022, Osaka, Japan (Online)
- O25. **C. Liu**, E. Knobloch, (2022) “Staircase solutions and stability in bounded salt-finger convection” *Euromech Colloquium 619 Oberbeck-Boussinesq Hypothesis and Beyond in stratified turbulence*, July 4-8, 2022, Wien, Austria (Hybrid)
- O26. **C. Liu**, C. P. Caulfield, D. F. Gayme (2021) “Structured input-output analysis of stably stratified plane Couette flow” *74th Annual Meeting of the APS Division of Fluid Dynamics*, November 21-23, 2021, Phoenix, Arizona
- O27. **C. Liu**, I. Gluzman, M. Lozier, S. Midya, S. Gordeyev, F. O. Thomas and D. F. Gayme (2021) “Spatial input-output analysis of large-scale structures in actuated turbulent boundary layers” *AIAA Aviation 2021 Forum*, August 2-6, 2021, Virtual Event
- O28. **C. Liu**, D. F. Gayme (2020) “A linear matrix inequality based approach for efficient approximation of permissible perturbation amplitude in wall-bounded shear flows at transitional Reynolds numbers” *73rd Annual Meeting of the APS Division of Fluid Dynamics*, November 22-24, 2020, Chicago, Illinois (Virtual)
- O29. **C. Liu**, D. F. Gayme (2019) “Convective velocities of vorticity fluctuations in turbulent channel flows: an input-output approach”, *11th International Symposium on Turbulence and Shear Flow Phenomena (TSFP11)*, July 30-August 2, 2019, Southampton, UK
- O30. **C. Liu**, D. F. Gayme (2018) “Input-output based analysis of convective velocity in turbulent channels”, *71st Annual Meeting of the APS Division of Fluid Dynamics*, November 18–20, 2018; Atlanta, Georgia
- O31. **C. Liu**, S. Fu, M. Zhang, H. Ren (2017) “Time varying hydrodynamics identification of a flexible riser under multi-frequency vortex-induced vibrations” *36th International Conference on Ocean, Offshore & Arctic Engineering*, June 25-30, 2017, Trondheim, Norway

## CONTRIBUTED POSTERS

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\_\_\_ : research mentee

- P1. J. Hu, **C. Liu** (2024) “Solving compressible plane Couette flow with numerical methods and physics-informed neural networks” Avon High School’s ACHIEVE Internship Program Showcase, September 17, Avon, CT
- P2. B. Machlus, **C. Liu** “Turbulent Channel Flow” Avon High School’s ACHIEVE Internship Program Showcase, September 17, Avon, CT
- P3. Y. Zaidi, **C. Liu** (2024) “Quantum-assisted hydrodynamic stability analysis” UConn Summer Research Day, UConn Health, July 25, CT
- P4. Y. Zaidi, K. Kochnev, **C. Liu** (2024) “Quantum-assisted hydrodynamic stability analysis” NASA CT Space Grant Consortium Grants Expo, November 8, Windsor Locks, CT
- P5. J. George, **C. Liu** (2024) “Reduced-order modeling of fluid-structure interactions” 2024 Long Island Sound Research Conference, May 15, Port Jefferson, NY
- P6. **C. Liu**, R. Muccino (2024) “Settling enhanced mixing in stably stratified flows” 2024 Long Island Sound Research Conference, May 15, Port Jefferson, NY
- P7. R. Muccino, **C. Liu** (2024) “Settling-driven layering in double-diffusive convection” 2024 Long Island Sound Research Conference, May 15, Port Jefferson, NY

- P8. Z. Li, A. van Kan, **C. Liu**, E. Knobloch (2024) “Traveling localized convective structures in an inclined porous layer” University of Washington Undergraduate Research Symposium, May 17, 2024, Seattle, WA
- P9. **C. Liu** (2024) “Reduced-order modeling and analysis of fluid flows” Connecticut Institute for Resilience & Climate Adaptation (CIRCA) Faculty & Staff Research Symposium on Climate Change: Challenges and Innovations, January 12, 2024, Storrs, CT
- P10. T. Tsubota, **C. Liu**, B. Foster, E. Knobloch (2024) “Bifurcation delay and front propagation in the real Ginzburg-Landau equation on a time-dependent domain” Dynamics Days US, January 8–10, 2024, Davis, CA
- P11. L. Xu, A. van Kan, **C. Liu**, E. Knobloch (2024) “Noise-Induced Transitions in Anisotropic Two-Dimensional Turbulence” Dynamics Days US, January 8-10, 2024, Davis, CA
- P12. **C. Liu** (2023) “Reduced-order modeling and analysis of fluid flows” UNH Pre-APS Fluid Dynamics Workshop, November 16-17, 2023, Durham, NH
- P13. **C. Liu** (2023) “Reduced order modeling and analysis of fluid flows” The symposium on ‘Flow, Turbulence, and Wind Energy’, October 17-20, 2023, San Juan, Puerto Rico
- P14. L. Xu, A. van Kan, **C. Liu**, E. Knobloch (2023) “Noise-induced transitions in anisotropic two-dimensional turbulence” *The 2023 Pi<sup>2</sup> Summer Scholar Symposium*, August 22 2023, Berkeley, CA
- P15. T. Tsubota, **C. Liu**, B. Foster, E. Knobloch (2023) “Dynamics of the real Ginzburg-Landau equation on a time-dependent domain” *Poster session of Berkeley Physics Undergraduate Research Scholars Program*, April 14, 2023, Berkeley, California
- P16. L. Xu, A. van Kan, **C. Liu**, E. Knobloch (2023) “Rare Transitions in Anisotropic 2D Turbulence” *Poster session of Berkeley Physics Undergraduate Research Scholars Program*, April 14, 2023, Berkeley, California
- P17. **C. Liu**, K. Julien, E. Knobloch (2023) “Staircase solutions and stability in vertically confined salt-finger convection” *Dynamics Days 2023*, January 9–11, 2023, Hartford, Connecticut (Online)
- P18. T. Tsubota, **C. Liu**, B. Foster, E. Knobloch (2022) “Dynamics in the real Ginzburg-Landau equation on a time-dependent domain” *The 2022 Pi<sup>2</sup> Summer Scholar Symposium*, August 22, 2022, Berkeley, California
- P19. **C. Liu**, K. Julien, E. Knobloch (2022) “Staircase solutions and stability in bounded salt-finger convection” *Boulder School for Condensed Matter and Materials Physics 2022: Hydrodynamics Across Scales*, July 4-29, 2022, Boulder, Colorado
- P20. **C. Liu**, E. Knobloch (2022) “Single mode solutions to convection in a porous medium”, *Dynamics Days 2022*, January 7-8, 2022 Atlanta, GA (Online)
- P21. **C. Liu**, D. F. Gayme (2021) “Structured input-output analysis of dominant flow structures in transitional plane Couette flow” *IPAM Workshop Transport and Mixing in Complex and Turbulent Flows*, January 11-14, 2021, Los Angeles, California (Virtual)

## RESEARCH MENTEE

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### Ph.D. students

- Van Duc Nguyen 08/2024-now
- Jino George 01/2024-now

### Undergraduate students

- Jay Yang 09/2024-now

- Kyle Goodwin 09/2024-now
- Charley Ma 09/2024-now
- Minh Bao Le 08/2024-09/2024
- Dinghui Peng 05/2024-06/2024
- Zhengyang Wei 04/2024-now
- Enzo Mangiafico 02/2024-now
- Reis Muccino 02/2024-now
- Yanlong Che 01/2024-now
- Yusuf Zaidi (Awarded NASA Connecticut Space Grant Consortium Internship \$7000) 01/2024-09/2024
- Kalin Kochnev (Awarded NASA Connecticut Space Grant Consortium Undergraduate Scholarship \$3000, UConn Summer Undergraduate Research Fund (SURF) Awards \$4000) 09/2023-now

### Senior Design

- ME04 (Sponsor: American Society of Naval Engineers) 09/2024-05/2025
- ME15 (Sponsor: Collins Aerospace) 09/2023-05/2024

### Visiting Students/Scholars

- Weichen Zhao (Undergraduate from Wuhan University of Technology) 06/2024-08/2024
- Lichuan Xu (Undergraduate from University of California, Berkeley) 04/2024-07/2024

### High School Students

- Joanna Wu 09/2024-now
- Aditya Thakar (Avon High School) 10/2024-now
- Benjamin Machlus (Avon High School's ACHIEVE Internship Program) 06/2024-08/2024
- Jingrui (Ray) Hu (Avon High School's ACHIEVE Internship Program) 06/2024-08/2024

### Research mentee before UConn

- Zhiwei (Dave) Li (Co-advised with Adrian van Kan and Edgar Knobloch) (Awarded APS DFD travel grant \$500)
- Lichuan Xu (Co-advised with Adrian van Kan and Edgar Knobloch) (Awarded Pi<sup>2</sup>(\$6600) and BPURS(\$750) and Berkeley Physics Undergraduate Student Travel Scholarship) Next position: Ph.D. student at University of Chicago
- Troy Tsubota (Co-advised with Benjamin Foster and Edgar Knobloch) (Awarded Pi<sup>2</sup>(\$6500) and BPURS(\$750))
- Aishwarya Rath (Co-advised with Dennice F. Gayme)
- Yu Shuai (Co-advised with Dennice F. Gayme) Next position: Ph.D. student at Princeton University

Pi<sup>2</sup>: Physics Innovators Initiative Summer Scholars; BPURS: Berkeley Physics Undergraduate Research Scholars

## TEACHING

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### Instructor

*University of Connecticut, Storrs, CT*

*01/2024 - now*

- ME 3253 Linear Systems (Spring 2025)
- ME 5895-001/ME 3295-001/ECE 6095-004 Nonlinear Systems (Fall 2024)
- CE2120 Applied Mechanics II (Spring 2024)

### Teaching assistant/Instructor

*Johns Hopkins University, Baltimore, MD*

*9/2018 - 5/2021*

- EN.530.334 SP21 Heat Transfer

- EN.500.111 FA20 Simple Mathematics Revealing Big Physics (HEART instructor)
- EN.530.343 SP20 Design and Analysis of Dynamical Systems
- EN.530.424/EN.530.624 FA19 Dynamics of Robots and Spacecraft
- EN.530.470 SP19 Space Vehicle Dynamics and Control
- EN.530.761 FA18 Mathematical Methods of Engineering I

## ACADEMIC SERVICE

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### Ph.D. Qualification Committee

- Zhiling Chen 08/2024
- Yang Kang Chua 09/2024

### Ph.D. Proposal Committee

- Aishwarya Rath (Johns Hopkins University) 12/2024

### University of Connecticut

- Jorgensen fellowship review Committee 02/09/2024
- Graduate Admission Committee 2023, 2024

### University of California, Berkeley

- Selection Committee of Physics Innovators Initiative (Pi<sup>2</sup>) 2023

**Proposal Reviewer/Panel:** National Science Foundation, Army Research Office

**Session Organizer:** SIAM Conference on Applications of Dynamical Systems (DS25) Minisymposium: Geophysical Fluid Dynamics

**Session Chair:** SIAM NNP annual meeting 2023, 77th Annual Meeting of the APS Division of Fluid Dynamics 2024

**Journal Reviewer:** Journal of Fluid Mechanics, Physics of Fluids, Computers and Fluids, Marine Structures, Ocean Engineering, Journal of Offshore Mechanics and Arctic Engineering, IEEE Control Systems Letters, Physica Scripta, Chaos, Solitons and Fractals, Applied Economics, Measurement Science and Technology, GEM - International Journal on Geomathematics, Journal of Physics A: Mathematical and Theoretical

**Book Reviewer:** Cambridge University Press

**Conference Reviewer:** IEEE Conference on Decision and Control, American Control Conference, International Conference on Ocean, Offshore & Arctic Engineering

## OUTREACH ACTIVITIES

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01. Judger of Senior Design Demo Day 04/26/2024
02. Judger of Graduate Research Competition 2024 04/22/2024
03. Faculty representative of Graduate Visitation Networking Event 02/23/2024
04. Judger of COE 10th Annual Poster Competition 02/23/2024
05. CAPS/McNair Faculty Mentor 01/2024 - now
06. UConn Career Champion Program 11/2023 - now
07. Faculty Mentor of UConn Connects Program; Mentee: Jieming Xiao (First-generation, 01/2024 - 05/2025), Nicolas Camacho (First-generation, 08/2024-12/2024)

- O8. APS-DFD peer mentoring program 11/2023
- O9. Panel on “Grad Info Session for Undergraduate Students” 11/13/2023
- O10. ENGR 1000 Out-of-Class Presentation: “Reduced-order modeling and analysis of fluid flows”  
11/8/2023
- O11. Roundtable discussion “Research Connection: Facets of Research” 10/12/2023

**PROFESSIONAL DEVELOPMENT**

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- Inclusive Excellence Program for Faculty and Staff: Justice, Equity, and Transformation (JET), Vergnano Institute for Inclusion *09/2024-05/2025*
- Consultation with Center for Excellence in Teaching and Learning *06/11/2024, 01/12/2024*
- Certificate for: Quantum Computing Fundamental, Professional Certificate Program, MIT xPRO  
*09/25/2023-12/04/2023*

**FIRST AUTHOR JOURNAL ARTICLE NUMBERS**

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Journal of Fluid Mechanics (5), Physical Review E (1), AIAA Journal (1), Geophysical & Astrophysical Fluid Dynamics (2), Fluids (1), Journal of Fluids and Structures (2), Physics Letters A (1)

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Updated on November 5, 2024

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