



**AmeriMech Symposium:
Non-reciprocal and Topological Wave
Phenomena in Solids and Fluids**

**AmeriMech
2019**
May 29-31, 2019
University of Missouri at Columbia

AMERIMECH SYMPOSIUM 2019

Non-reciprocal and Topological Wave Phenomena in Solids and Fluids

May 29-31, 2019, Columbia, Missouri, USA

Symposium Agenda Day I (May 29th) in Room 101 Swallow Hall

7:00-8:45

Breakfast & Registration

Time

Speaker

Title

8:45-9:00

Dean Elizabeth G. Lobo

*Dean and Ketcham Professor of the
College of Engineering, University of
Missouri-Columbia*

Welcome remarks

Non-Reciprocal Wave Propagation I

Session Chair: Mike Haberman

9:00-9:25

Arkadii Krokhin

University of North Texas

Nonreciprocal transmission of sound
through periodic and disordered
dissipative phononic crystals

9:25-9:50

Arup Neogi

University of North Texas

Passive Non-reciprocity of Acoustic
Wave Propagation in Viscous Fluids and
its Application

9:50-10:15

Richard Weaver

*University of Illinois at Urbana-
Champaign*

Testing Reciprocity in an Ultrasonic
Diffuse Field Electro-Acoustic system

10:15-10:45

Coffee break

Non-Reciprocal Wave Propagation I

Session Chair: Gaurav Bahl

10:45-11:10

Lan Yang

Washington University in St. Louis

Exploring exceptional points in
whispering-gallery-mode resonators

11:10-11:35

Yangyang Chen

University of Missouri-Columbia

Nonreciprocal metasurface and its
programmed elastic wave control

11:35-12:00

Junfei Li

Duke University

Transfer matrix method for analysis of
space-time modulated systems

12:00-1:30

Lunch



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**Topological Wave Phenomena
Session Chair: Hussein Nassar**

- | | | |
|------------------|---|---|
| 1:30-1:55 | Gaurav Bahl
<i>University of Illinois at Urbana-Champaign</i> | Topologically robust mechanical pumping |
| 1:55-2:20 | Fabio Semperlotti
<i>Purdue University</i> | Acoustic Valley Hall Effect in elastic waveguides: design, simulations, and experiments |
| 2:20-2:45 | Ying Wu
<i>South China University of Technology, Guangzhou, Guangdong, China</i> | On-chip valley topological materials for elastic wave manipulation |
| 2:45-3:10 | Yiwei Xia
<i>Georgia Institute of Technology</i> | Topological edge modes in quasiperiodic locally resonant metastructures |

3:10-3:40

Coffee Break

**Topological Wave Phenomena
Session Chair: Fabio Semperlotti**

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|------------------|--|---|
| 3:40-4:05 | Lazaro Calderin
<i>University of Arizona</i> | Topology and Non-reciprocity in Elastic Fields: Method of Analysis and Applications |
| 4:05-4:30 | M Arif Hasan
<i>University of Arizona</i> | Experimental demonstration of spin-like topology in a coupled acoustic waveguide |
| 4:30-4:55 | Guang Bian
<i>University of Missouri-Columbia</i> | Exploring Topological Phases of Condensed Matter by Angle-Resolved Photoemission Spectroscopy |
| 4:55-5:20 | Yang Long
<i>Tongji University, China</i> | Floquet topological acoustic resonators and acoustic Thouless pumping |

6:00-8:00

Reception



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Symposium Agenda Day II (May 30th) in Room 101 Swallow Hall

7:00-8:00

Breakfast

Time

Speaker

Title

**Non-Reciprocal Wave Propagation II
Session Chair: Ramathasan Thevamaran**

8:00-8:25

Harish Krishnaswamy
Columbia University

Integrated non-reciprocal electronics based on time-modulation: recent results and future directions

8:25-8:50

Li Quan
University of Texas at Austin

Maximum Non-reciprocal Willis Scatterers

8:50-9:15

Bogdan Popa
University of Michigan

Scalable active metamaterials for non-reciprocal linear acoustics

9:15-9:40

Chen Shen
Duke University

Non-reciprocal Wave Propagation in Time-modulated Coupled Cavities

9:40-10:05

Benjamin Goldsberry
University of Texas at Austin

Non-reciprocal Wave Propagation in Mechanically-Modulated Continuous Elastic Metamaterials

10:05-10:30

Coffee Break

**Non-Reciprocal Wave Propagation II
Session Chair: Andres Arrieta**

10:30-10:55

Amir Darabi
Georgia Institute of Technology

Passive Non-Reciprocity in Acoustic Periodic Media Using Nonlinearity, Hierarchical Scales, and Asymmetry

10:55-11:20

Sai Kalyan Evani
University of Illinois at Urbana-Champaign

Reciprocal ultrasonic measurements for detecting damage in concrete

11:20-11:45

Samuel Wallen
Applied Research Laboratories, University of Texas at Austin

Non-reciprocal vibrational system through bilinearity

11:45-12:10

Ahmed Elbanna
University of Illinois at Urbana-Champaign

Non-reciprocal wave propagation in structural systems on time modulated elastic substrates

12:10-1:30

Lunch



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**Wave Control Applications
Session Chair: Arkadii Krokhin**

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|------------------|--|--|
| 1:30-1:55 | Abigail Juhl
<i>Air Force Research Laboratory</i> | Mechanical Instability tuning in
Architected Magnetoelastomers |
| 1:55-2:20 | Ramathasan Thevamaran
<i>University of Wisconsin-Madison</i> | Controlling acoustic waves with non-
Hermitian metamaterials |
| 2:20-2:45 | Pawel Packo
<i>AGH - University of Science and
Technology, Krakow, Poland</i> | Non-symmetric flexural wave scattering
and one-way extreme absorption |
| 2:45-3:10 | Andres Arrieta
<i>Purdue University</i> | Control of wave propagation in Bistable
Lattices |

3:10-3:40

Coffee Break

**Wave Control Applications
Session Chair: Yangyang Chen**

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|------------------|---|--|
| 3:40-4:05 | Myungwon Hwang
<i>Purdue University</i> | Energy harvesting from transition waves
in discrete bistable lattices |
| 4:05-4:30 | Yan Lu
<i>Illinois Institute of Technology</i> | Hyperboloidal dispersion and exceptional
point distribution in phononic crystals |
| 4:30-4:55 | Jinwoong Cha
<i>Korea Advanced Institute of Science and
Technology</i> | On-chip phononic devices operating at
MHz frequencies |
| 4:55-5:20 | Se Kwon Kim
<i>University of Missouri-Columbia</i> | Chiral Edge Mode in the Coupled
Dynamics of Magnetic Soliton Disks and
the Mechanical Control of its Chirality |

6:00-9:00

Banquet



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Symposium Agenda Day III (May 31st) in Room 101 Swallow Hall

7:00-8:00

Breakfast

Time

Speaker

Title

Spatial and Time Modulation

Session Chair: Tsampikos Kottos

8:00-8:25

Hussein Nassar
University of Missouri-Columbia

Bulk-Bulk Correspondence and Band
Shearing in Time-Driven Waveguides

8:25-8:50

Daniel Torrent
Universitat Jaume I, Spain

Nonreciprocal diffusive transport by
spatio-temporal modulation

8:50-9:15

Matheus Rosa
Georgia Institute of Technology

Topological Pumping in Spatially
Modulated Elastic Structures

9:15-9:40

Ornella Mattei
University of Utah

Wave propagation in space-time
microstructures: the theory of field
patterns

9:40-10:05

Carson Willey
Air Force Research Laboratory

Auxetic Shunted Piezoelectrics for
Nonreciprocal Wave Propagation

10:05-10:30

Coffee Break

Spatial and Time Modulation

Session Chair: Daniel Torrent

10:30-10:55

Srikantha Phani
University of British Columbia, Canada

Dissipation at Dispersion Crossroads

10:55-11:20

Tsampikos Kottos
Wesleyan University

Hypersensitivity and non-Reciprocity in
Non-Hermitian Mechanical Wave
Transport

11:20-11:45

Emil Prodan
Yeshiva University

Topological Meta-Materials Inspired by
Topological Superconductors and their
Exotic Applications

11:45-12:00

Noah D. Manring
*Department Chair, Mechanical and
Aerospace Engineering, University of
Missouri-Columbia*

Closing Remarks

12:00-1:30

Lunch



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Non-speakers include:

Matthew Guild (NRL), Mark Spector (ONR), Tanner Balance (Purdue), Matthew Kelsten (Rutgers), John Yoritomo (UIUC), Aman Thakkar (Purdue).

Sponsors:

