

Advances in Nonlinear Dynamics  
Abstracts

Saturday 3:15 – 5:15

Mary Sibling, Northwestern University  
Nancy Rodriguez, Stanford University  
Alethea Barbaro, UCLA  
Brittany Erickson, Stanford University

Sunday 8:30 – 10:30

Mary Pugh, University of Toronto  
Maria Pia Guldani, UT Austin  
Carola-Bibiane Schoenlieb, University of Cambridge  
Juhi Jang, UC Riverside

---

Saturday 3:15 – 5:15

**Spatio-temporal feedback control of unstable wave patterns**

Mary Silber, Northwestern University

We extend the methods of Pyragas time-delayed feedback control of unstable periodic orbits to the situation where the unstable periodic orbits arise in a symmetry breaking Hopf bifurcation. We consider traveling wave patterns with spatio-temporal symmetries, as well as oscillator patterns for equivariant Hopf bifurcation problems.

**TITLE**

Nancy Rodriguez, Stanford University

**ABSTRACT**

**An evolving network model for gang rivalries in Los Angeles**

Alethea Barbaro, UCLA

Gang rivalries is a leading cause of violent crime in many cities. However, there is still much to be understood about how and why these rivalries form. We introduce an agent-based model coupled to an evolving network in order to explore how such rivalries might arise.

**TITLE**

Brittany Erickson, Stanford University

**ABSTRACT**

---

Sunday 8:30 – 10:30

## **A new result in blow-up for long-wave unstable thin film equations**

Mary Pugh, University of Toronto

This talk will provide an introduction to long-wave unstable thin film equations of the form  $u_t = - (u^n u_{xxx})_x - B (u^m u_x)_x$ . The exponents  $n$  and  $m$  determine whether or not finite-time blow-up of the solution might occur. In this talk, we present new results for the critical case  $n=m+2$  on the line. This is joint work with Marina Chugunova and Roman Tarantets.

## **A factorization method for non-symmetric linear operator: enlargement of the functional space while preserving hypo-coercivity.**

Maria Pia Guldani, University of Texas at Austin

We present a factorization method for non-symmetric linear operators: the method allows to enlarge functional spaces while preserving spectral properties for the considered operators. In particular, spectral gap and related convergence towards equilibrium follow easily by hypo-coercivity and resolvent estimates. Applications of this theory on several kinetic equations will be presented.

### **TITLE**

Carola-Bibiane Schoenlieb, University of Cambridge

### **ABSTRACT**

## **Compressible fluids with vacuum**

Juhi Jang, UC Riverside

I'll discuss some vacuum states arising in gas dynamics. The rigorous results include the well-posedness of compressible Euler equations with vacuum free boundary and some open problems will be addressed.