2018 CPS V&V GRAND PRIX

Carnegie Mellon University

December 11, 2018

2018 CPS V&V GRAND PRIX

TOYOTA
TOYOTA TECHNICAL CENTER

SIEMENS

National Aeronautics and Space Administration

galois

APTIV

HRL LABORATORIES

EDGE CASE RESEARCH

ARGO AI

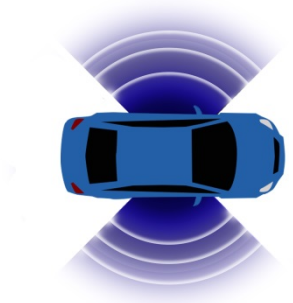
DAIMLER

IMANDRA

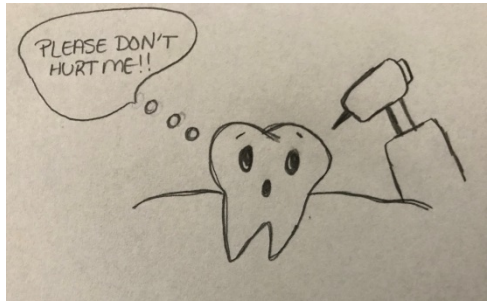
Judges

- **Alwyn Goodloe**
  NASA
- **Christof Budnik**
  Siemens
- **Jim Kapinski**
  Toyota
- **Michael Maass**
  Aptiv
- **Matt Clark**
  Galois
- **Aaron Kane**
  Edge Case Research
- **Aleksey Nogin**
  HRL Laboratories
- **Pete Rander**
  Argo AI
- **Grant Passmore**
  Aesthetic Integration

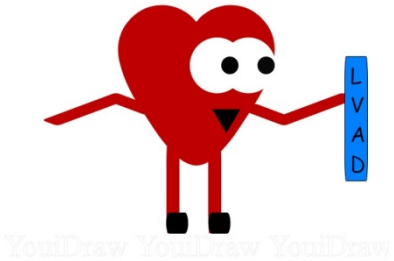
Students & Projects



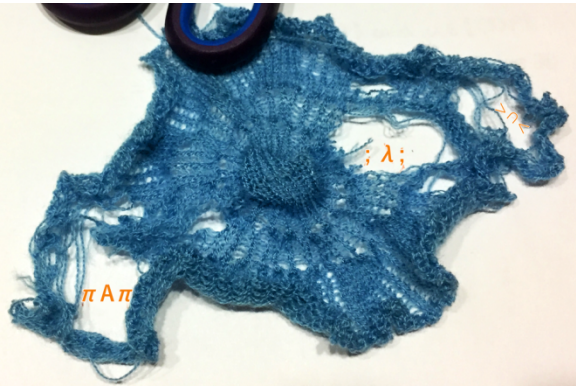
Dhruv Mahajan & Ishan Pardesi
"Formal Verification of V2I-aided Autonomous Driving: A Hybrid Games Approach"



Sheela Hanagal & Minji Kim
"Modeling the Dynamics of a Smart Dental Drill"



Naina Checka & Rishabh Brajabasi
"Modelling Safe Left Ventricular Assist Devices"



Jenny Lin
"Physically Motivated Safety Guarantees for Machine Knitting"

Students & Projects

Klaas Pruiksma
"Focusing for dL"

$$\frac{\mathcal{D} \quad \mathcal{E}}{\mathcal{F}} \equiv \frac{\hat{\mathcal{D}} \quad \hat{\mathcal{E}}}{\mathcal{F}}$$

Katherine Cordwell
"**Towards Efficient Quantifier Elimination in Mathematica"**

Quick Quantifier Efficient Elimination

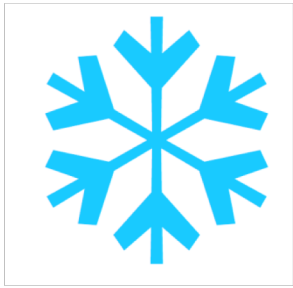
Siva Somayyajula & David Kahn
"On a Decidable Fragments of dL"

$\Delta_0 \mathcal{L}$

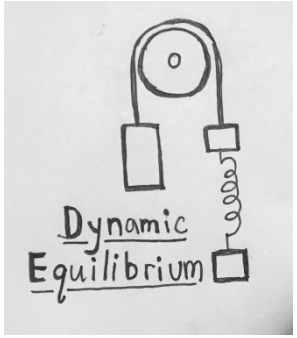
Students & Projects

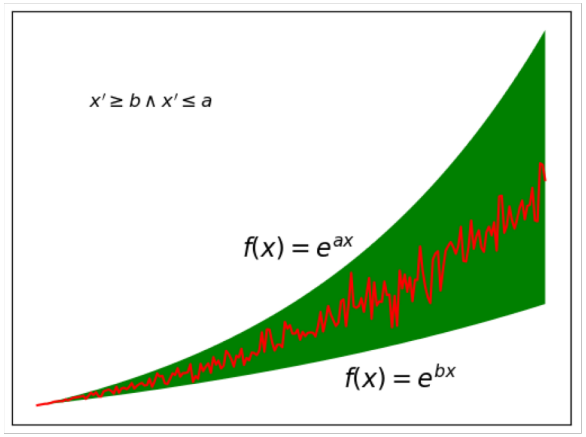
Corwin de Boor
“KeYmaera X++: Improving the Proof Experience”

Naveen Pai
“Slalom: Modelling obstacle avoidance during skiing”



Katherine Kireeva
“Using Vpython to Analyze a Dynamic Equlibrium System”





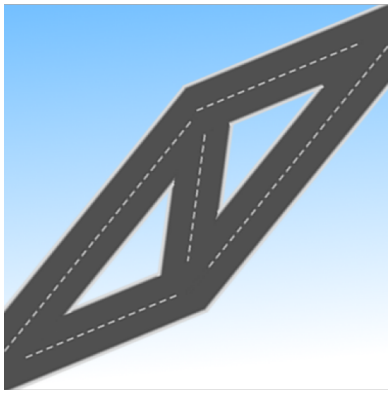
Benjamin Lim & Yao Chong Lim
“Differential-Algebraic Dynamic Logic for KeYmaera X”

Chun Kai Ling & Daniel L.-K. Wong
“Locked-on: verifying controls for aircraft tracking”

Students & Projects

Joshua Durham
"BusyBees: Safe Controllers for Multi-Agent Swarms"

Matthew Battifarano
"Formal Verification of Traffic Networks at Equilibrium"



Abhishek Bhargava & Michael You
"Statistical Model Checking for Algorithmic Trading Strategies via Simulation of Geometric Brownian Motion"

CPS Capital