

## Participants

PI: Dr. Kamil Walczak – Pace University

## Student – “Topic”

Rita Aghjayan – “Thermal Rectification”

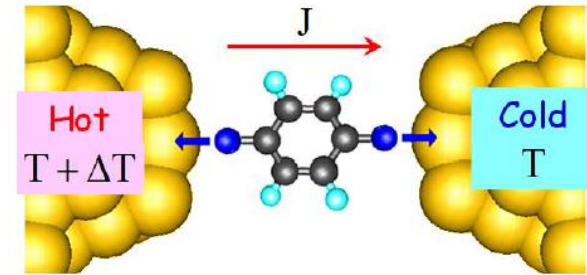
Arthur Luniewski – “Molecular Noise”

David Saroka – “Tunneling of Heat”

Luke Shapiro – “Thermal Memristors”

Joanna Dyrkacz – “Inelastic Heat Flow”

## Single-Molecule Junction



$$J = \frac{\hbar^2}{2m} \Re \left\{ \Psi^+ \vec{\nabla} \frac{\partial \Psi}{\partial t} - \frac{\partial \Psi}{\partial t} \vec{\nabla} \Psi^+ \right\}$$

## Goals

- To understand mechanisms involved into the processes of energy transfer at molecular level.
- To propose and simulate the behavior of new type of nanoscale devices.
- To develop formalism and algorithms useful in quantum thermodynamics far from equilibrium conditions.

## Research Foci

### Idea #1

Nonlinear corrections to heat fluxes and all associated noises to derive and check new noise-signal relations by numerical simulations.

### Idea #2

To apply physical models with appropriate nanoscale phenomena to study energy transfer in molecular and biological complexes.