Area of research

- Psychophysiology of emotion, personality, psychopathology
  - Anxiety and autonomic nervous system (ANS) activity
    - Cardiac vagal (parasympathetic) control via heart rate variability (HRV) analysis

- Theoretical foundations:
  - Neurophysiological models of anxiety and defensive responding
  - HRV as an index of central-ANS integration in the service of emotion regulation & social engagement
    - Autonomic flexibility
    - Neurovisceral integration
    - Polyvagal theory
    - Functional psychopathology

- Anxiety & autism spectrum disorders
  - Impaired social interactions
  - Extreme anxiety in response to change
Findings

**Prediction:** Low cardiac vagal control in anxiety, as indicated by a variety of HRV measures

**Supported:** Reduced *respiratory sinus arrhythmia* (RSA; rMSSD, HF ECG spectral power) in:

- **Panic disorder** (Friedman et al, 1993; Friedman & Thayer, 1998a)
- **Generalized anxiety disorder** (Thayer, Friedman, & Borkovec, 1996; Thayer, Friedman, et al. 2000)
- **Elevated HR in high worry women** (Knepp & Friedman, 2008)
- **Consistent findings across various forms of anxiety** (state, trait, pathological; Friedman & Thayer, 1998b; Friedman, 2007)
- **RSA correlated with various measures of pro-social behavior in children with autism** (Patriquin, Scarpa, Friedman, & Porges, 2012)
- **Supportive findings on defensive responding in autism** (Patriquin, Scarpa, Friedman, & Porges, under review)
Ways my research can contribute to the mission of CAR (multidisciplinary autism research)

- **Psychophysiological approach**: Non-invasive assessment of autonomic activity in autism
  - ECG—HR & HRV analysis
  - *Impedance cardiography*: sympathetic cardiac activity
  - *Electrodermal activity*: global sympathetic activation
  - *Hemodynamic activity*: blood pressure
- **Variety of experimental paradigms**:
  - Laboratory-based ANS assessment under a broad range of conditions
  - Emotion induction (films, music)
- **Integrate theoretical perspectives** (e.g., autonomic flexibility) with approaches from other disciplines
Current working relationships & available resources

Ongoing collaboration:
- Angela Scarpa, VT Autism clinic
- Susan White, VT Autism clinic
- Michelle Patriquin, Dept. of Psychology
- Ken Kishida, VTCRI
- Stephen Porges, Research Triangle Institute
  - Publications: 1 journal article, 1 book chapter (in press); 1 paper under review
  - Submitted R21 revision
  - Autism symposium at the upcoming meeting of the Society for Psychophysiological Research (Sept. 2012)

- Mind-Body Lab: 253 WMS Hall; fully equipped psychophysiology lab, three graduate students
Collaborations/resources needed to make multidisciplinary research program possible

• Current/future directions
• Access to affected clinical samples
• Clinical intervention studies
• Brain imaging technology
• Neural economics
• Open to new ideas!