Autism Laboratory
Thomas Jefferson University, Department of Occupational Therapy

Mission
To enhance successful and meaningful participation in daily living, educational, social, and leisure activities for individuals with autism spectrum disorder (ASD) and their families by investigating the factors that impact participation, the occupational therapy interventions (OT) which aim to foster participation, and the types of physical and social environmental adaptations which lead to the best outcomes.

Current Projects
1) Testing Outcomes of Occupational therapy using Ayres Sensory Integration in Comparison to Behavioral Intervention to Improve Functional Skills in Children with Autism (Drs. Roseann Schaaf, Sophie Molholm, John Foke, Liz Ridgeway, and Zoe Mailloux; Research Assistant Rachel Dumont)
This research focuses on testing the implementation of an evidence-based program of occupational therapy using sensory integration principles. Outcomes include measures of multisensory integration (via ERP), behavior, activity and participation.

2) Changes in Brain Function Following Sensory Integration Intervention (Drs. Roseann Schaaf, Laura Krisa, Andrew Newberg, Feroze Mohammed and Chris Conklin; Research Assistant Kathryn Dent)
This research will test the feasibility of examining neuroplastic changes in connectivity and brain functions via diffusion tensor imaging and fMRI following a 30-minute intervention designed to improve sensory integration. Our hypothesis is that children with autism (ages 5-9) will show improved resting state connectivity (whole brain) and more integrated connectivity in the somatosensory cortex and the salience network; and these will be related to measurable changes in functional skills and individualized goals.

3) Greater Opportunity for Academic Learning (GOAL²) (Dr. Potvin)
A growing number of young adults with high functioning autism spectrum disorder and other disabilities are attending college. These young adults are often experiencing challenges with the social and academic aspects of college life. The coaching in context approach designed for the EuREKA Project is used with young adults attending college to achieve their own academic and social integration goals.

4) Sensory Aware and Friendly Environments (SAFE) (Dr. Mailloux)
We all want to feel comfortable, focused and at ease in all the environments in which we live, work, learn and socialize. Everyone has preferences for the various sensory experiences such as color, sound, scents, texture and the options available for movement and activity. For some individuals, these preferences are more extreme to the point that certain sensations can actually be painful, distracting and confusing. SAFE is a program under development to assist businesses and organizations in making their facilities and services more sensory aware and friendly.
5) Expanding Recreational Engagement in Kids with Autism Spectrum Disorder (EuREKA Project) (Dr. Potvin)
Individuals with autism spectrum disorders (ASD) have restricted patterns of participation in recreational activities. They participate in fewer activities, with a narrower range than other people, and closer to home than their same-aged peers. Thus, participation in recreational activities if often compromised in individuals with ASD and may impact quality of life (QoL). The EuREKA Project investigates the effect of an inter-professional approach that combines parent coaching and context therapy (coaching in context) to increase the recreational participation of children with ASD. This manualized, parent-mediated, culturally responsive intervention draws from current empirical evidence across a number of health professions.

6) Innovative Design for Engaged Attention and Learning (IDEAL) (Dr. Mailloux).
Children are spending more and more time in sedentary activities, with increased hours in front of computer, television and hand-held screens. At the same time, academic expectations are increasing and options for physical activity at parks, playgrounds and recess spaces are diminishing. While these societal trends make is harder for children to engage in the active play their brains and bodies need to grow and develop, we also expect them to sit in stable, 4-legged chairs that are often the wrong size for their bodies. What if they could sit in chairs that adjusted to the correct height and that provided the types of motion and flexibility most adults expect and enjoy in their work furniture? What if classrooms were designed and arranged to support learning needs? Isn't it it time that we all aim for classrooms that support basic sensory and ergonomic considerations for children?

Planned Projects
Research suggests that boys with XYY and ASD demonstrate sensory symptoms that are more like a matched comparison group of individuals with idiopathic ASD than other individuals with XYY. Sensory features may aid in identification of the ASD phenotype and provide clues for genetic markers of ASD leading to earlier differential diagnosis of ASD and implementation of targeted interventions. By evaluating sensory functions in individuals with XYY with and without ASD and comparing them to children with ASD, we may gain more understanding of the underlying sensory differences in ASD.

2) The role of auditory change detection in predicting language difficulties in ASD (Dr. Green & Dr. Schaaf)
Differences in latency of the auditory mismatch negativity have been associated with language impairment in ASD and may be an early biomarker of language impairment in these individuals. This study will use electroencephalography recording methods to explore timing of the mismatch negativity in infants at risk for ASD and explore the relationship between differences in auditory change detection at 6 months and language skills and presence/absence of ASD characteristics in these individuals at the age of three. Such early sensory perception differences could be crucial to identifying infants at risk for
language impairment in ASD years before behavioral methods can be used, thus leading to earlier intervention and improving language outcomes in these individuals.

For more information regarding this lab please visit our website at:

http://www.jefferson.edu/university/health-professions/departments/occupational-therapy/research.html

Selected Publications


**Funding Sources**
- National Institutes of Health – NICHD
- VIRCO Corporation
- American Occupational Therapy Foundation

**Collaborators**
- Sophie Molholm, PhD, Albert Einstein Medical Center and Rose F. Kennedy Children’s Evaluation and Rehabilitation Center (CERC)
- John Foxe, PhD, Professor and Chair, Department of Neuroscience, University of Rochester Medical Center
- Elizabeth Ridgway, OTD, OTR/L, *Director of Pediatric Occupational Therapy, Assistant Professor, Department of Pediatrics*, Albert Einstein College of Medicine and Rose F. Kennedy Children's Evaluation and Rehabilitation Center (CERC)
- Joanne Hunt, OTD, OTR/L, Children’s Specialized Hospital, Mountainside, NJ
- Elke van Hooydonk, OTD, OTR/L, Children’s Specialized Hospital, Tom’s River, NJ
- Patricia Faller – OTD, OTR/L, Children’s Specialized Hospital, Tom’s River, NJ
- Alison Lane, PhD, OTR/L, Associate Professor, University of New Castle, Australia
- Dr. Shelly Lane, PhD, OTR/L, FAOTA, Professor and Chair University of New Castle, Australia
- Patricia A. Prelock, PhD, University of Vermont
- Liliane Savard, PhD, University of Vermont
- Min Li, PhD, Norwich University
- Gillian Rai, PhD, George Washington University
- Andrew Newberg, MD, Thomas Jefferson University and Hospital
- Feroze Mohammed, PhD, Thomas Jefferson University and Hospital
- Chris Conklin, PhD, Jefferson University
- Judith Ross, MD, Jefferson University and Hospital