

## **The Transdisciplinary Research in Emotion, Neuroscience, and Development (TREND) Artist in Residence Series**

This series brings an artist and neuroscientists together for 1-4 days each year to exchange perspectives, methods for thinking about emotion and visual representation, and to apply the tools of neuroscience to understanding or advancing the artist's vision.

### **Goals**

The series has the following goals geared towards pushing the boundaries of both art and science:

- 1) Artists regularly trade in the currency of emotion, but are rarely exposed to the newest thinking on emotion from the scientific community. We hope the perspective of science can inform their art. Thus we work to expose our artists to the most cutting edge neuroscience associated with emotion, mood, and mood disorders.
- 2) Neuroscientists are often entrenched in a dry data-centered way of thinking about emotion which can, unless it is regularly infused by perspectives from the heart of passion, become far from the phenomenon they are studying. Thus, we work to expose our students, faculty, and staff to a perspective on emotion by an artist whose livelihood depends on understanding and evoking emotion but who may not have come by their understanding from the same perspective that we do.
- 3) Both science and art depend on being able to represent information in a visually compelling way. Artists and scientists receive very different training in how to pursue this goal. We hope this series will help to cross-pollinate traditions for representing information visually.
- 4) The tools of neuroscience are uniquely suited to helping to understand processes and mechanisms associated with the perception of art. Towards this end, we provide opportunities for the artist to examine brain processes that unfold as people interact with their art. As scientists, we have found that these collaborations push us to use our technologies in ways we had not previously considered.

### **The Experience**

Artist-in-residence visits generally last 1-4 days. Essential activities include:

- Formal and informal meetings with scientists at the University of Pittsburgh and Carnegie Mellon whose work is most closely matched to the topics or goals of the artist.
- Time spent clarifying goals and potential for using neuroscience and associated assessment technologies to address the artist's questions (often begins before the actual visit).
- Assess brain function as the artist and TREND members interact with the artist's work using technologies such as eye-tracking, psychophysiological assessment (e.g., pupil dilation, heart rate), event-related potentials, and functional magnetic resonance imaging (fMRI).
- Working with faculty and students to analyze collected data in light of the artist's questions.
- A TREND lecture by the artist describing their art and process, particularly as might be informative for neuroscientists. If we have any results from our assessments at the time of the lecture, this is a great time to present them.

### **Series Facilitator**

The *TREND Artist in Residence* series is facilitated by Greg Siegle, Ph.D an Associate Professor of Psychiatry at the University of Pittsburgh, School of Medicine where he directs the Program in Cognitive Affective Neuroscience (PICAN). His primary research involves understanding brain processes of recovery from depression and spans the disciplines of clinical psychology, neuroscience, and artificial intelligence. He is also a computer graphics and glass artist, published poet, and performing musician.

**Contact:** Artists wishing to be considered for this program and media should contact Dr. Greg Siegle at [gsiegle@pitt.edu](mailto:gsiegle@pitt.edu).

## TREND ARTISTS

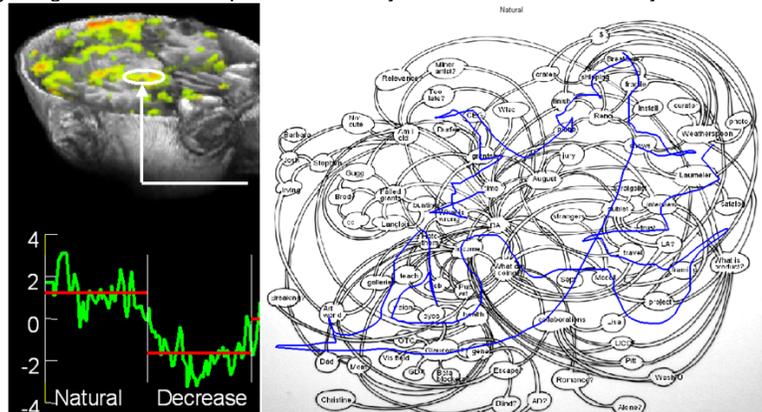
### 2007-2008 - Deborah Aschheim

<http://www.deborahaschheim.com/>

Medium: Sculptural installations and drawings

Topic: Neural mechanisms of personal narratives and worry

Deborah was interested in how her brain processed her worries. So she made a network of her worries (right) and followed her thoughts with a mouse during functional magnetic resonance imaging (fMRI). Brain regions associated with emotion such as the amygdala were more active when she was worrying than when she tried to control her emotions (left) suggesting that emotional aspects of her worry were under some voluntary control.



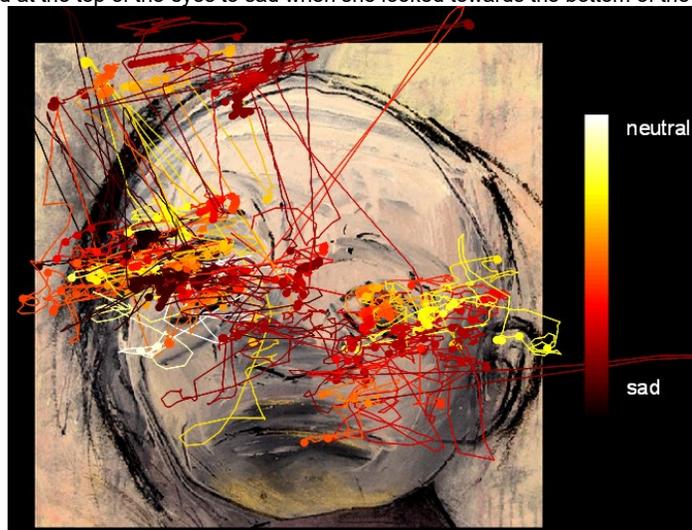
### 2008-2009 - Connie Cantor

<http://www.conniecantor.com/>

Medium : Paintings

Topic : Emotional memories

Connie was interested in how she reacted to her pictures of emotionally salient moments in her life. So she viewed a self-portrait while she rated her emotion from sad to happy with a mouse while we tracked her gaze. The plot below shows her eye-gaze colored by her emotion. She spent the majority of the time looking at the eyes, and her emotion varied from neutral when she looked at the top of the eyes to sad when she looked towards the bottom of the eyes.



### 2009-2010 – Lia Cook

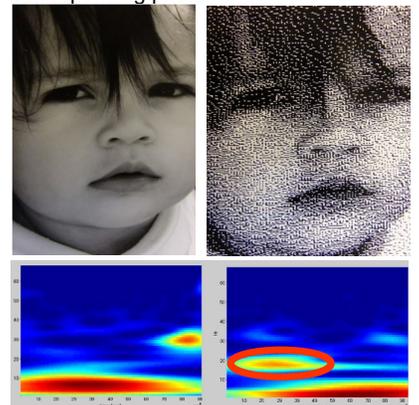
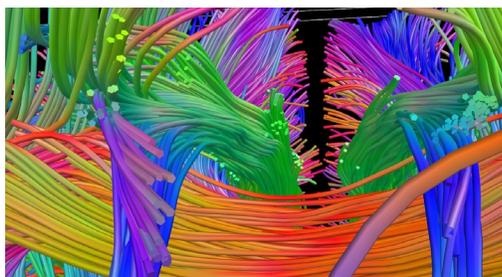
<http://www.liacook.com/>

Medium: Weaving

Topic: Weaving and the brain

As a weaver, Lia was interested in the “weavings” of white matter in the brain. Using diffusion spectrum imaging, Lia went home with images of her own white-matter tractography which she is currently which she is using as resource for a new work with woven faces.

Lia was also interested in the nature of people’s emotional connection to woven interpretations of faces. Using electroencephalography (EEG) we showed greater “beta power”, associated with active attention in the first 30 seconds of exposure to her weavings compared to a corresponding photo.



## 2010-2011 – Richard Claraval

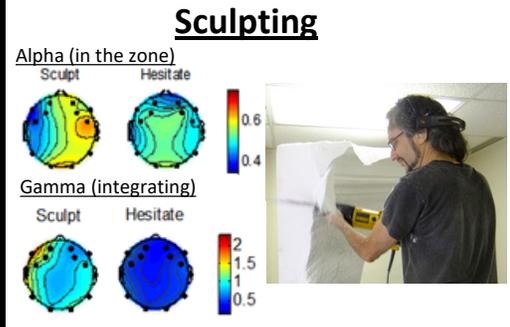
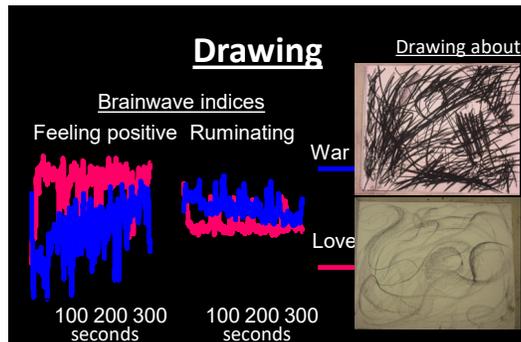
<http://richardclaraval.com/>

Media: charcoal (drawing)  
styrofoam (sculpture)

Topic: Emotions during the creative process

Rick wore a newly available ambulatory EEG rig to capture his brainwaves while he was drawing and sculpting. We showed that as he drew about love he felt positive. When he drew about war it looked like he was ruminating, but he became more positive over time as he switched from thinking about war itself to thinking about the art he was making about it.

When he was sculpting, Rick's brain looked similar to when someone is calm and relaxed, and also integrating features of the sculpture into a coherent whole. When he was hesitating, both of these were reduced, suggesting he had stepped out of the "zone".



## 2012-2013 – Holly Hanessian

<http://www.hollyhanessian.com/>

Media: Clay

Topic: Touch in Real Time:

Touch a social participatory activity

Holly measured people's EEG while they held her hand with clay in between their hands. While the EEG data captured their brain activity associated, the clay captured the social bond they were creating.

## 2014-2015 – Pittsburgh ScareHouse

<https://www.scarehouse.com/>

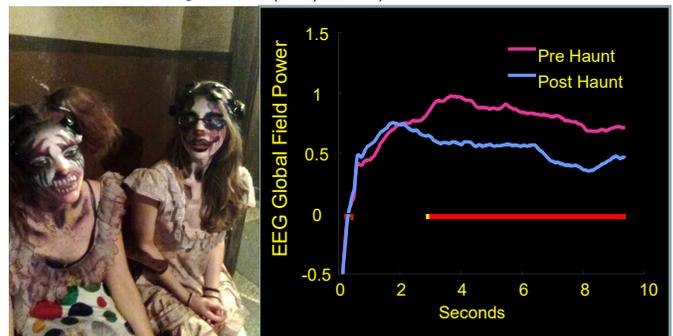
Medium: Haunted House

Topic: Why do we like to be scared?

From 2014-2015 the Artist in Residence Program morphed into an all-out science-outreach program, setting up a brain measurement lab in the ScareHouse Basement, an extreme haunted house. We worked with Margee Kerr, the Basement's director, to measure patron's brains before and after they participated in the Basement Experience to understand how the experience of visiting a haunted house affected people. We also measured actors as they transitioned from their every-day heads to their horrific characters. Many students were engaged in data collection during haunt nights. This project resulted in many presentations for actors and staff and many lay public presentations, summary presentations at multiple University of Pittsburgh events, and a publication.

EEG data showing that brains display blunted reactivity following voluntary scary experiences (from Kerr et al (2017) *Emotion*)

Evil clowns wearing EEG



## 2016-2017 – Quantum Theater

<http://www.quantumtheatre.com/>

Medium: Theater

Topic: How does our brain govern our experience of what is real and not real?

The 2016-2017 artist in residence series continued our external science-outreach efforts, setting up brain measurement stations in the lobby of the Quantum Theater which was putting on a show that featured neuroscience themes. Students were involved in helping set up the measurement protocols. Quantum staff learned to explain real brain measurement to patrons, who had their brains measured at receptions before and after the show. The season ended with a "talk back" following the show, with Dr. Siegle, who demonstrated live brain measurements to the audience and discussed the neuroscience of theatre and the show's themes.

## 2017 – 2018 – Urok Shirhan

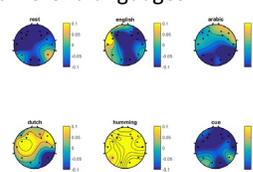
<http://www.urokshirhan.com/>

Medium: Music

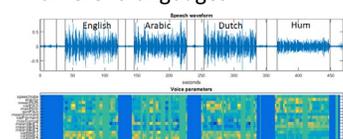
Topic: How does the language in which we sing affect our experience of song?

In 2017, Dr. Siegle was on sabbatical in the Netherlands. During this time he brought the PICAN artist in residence series to Europe, where Urok Shirhan, a performance artist interested in linguistic processing combined brain and physiological measurements taken while she sang the same song in multiple languages with their audio recordings to

Alpha EEG during singing in different languages



Vocal parameters during singing in different languages



create an installation piece that immersed the viewer in how she changed perspectives based on her linguistic set. The work culminated in a presentation to the Netherlands Institute for Advanced Studies entitled "Xenophones: Strange Sounds". The artist is still working on putting this work into a show-format.

## 2019-2020 – FRZY

<https://thefrzy.com/>

Medium: Music

Topic: How is music generated and perceived in the brain; can these brain processes be translated to make new music?

Frzy composed raps during fMRI and EEG, and people listened to FRZY's and other rappers' music during EEG. We used computational linguistics to understand the semantic space in which FRZY's raps were made and analyzed data based on these. We composed music based on the recorded EEG and fMRI data.

