



UNIVERSITY OF SOUTH CAROLINA

Development of Sustained Attention in Infants

Data Blitz, Institute for Mind and Brain

John E. Richards

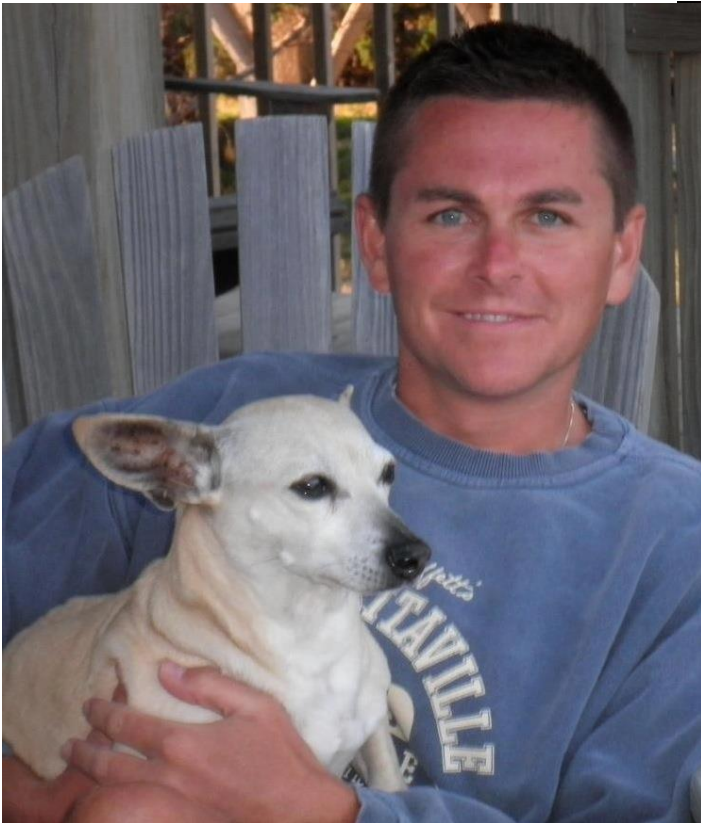


Development of Sustained Attention in Infants

- 1—Rapid changes in attention and memory in young infants**
- 2—These changes happen in cognitive processes that have a known brain basis in adults**
- 3—Hypothesis: Brain development is responsible for attention development**
- 4—Develop quantitative models that can be used to measure infant brain structure**
- 5—Develop quantitative models that can be used to measure infant brain function**
- 6—Multimodal methods relating infant brain development to infant attention development**

Brain Structure

Structural MRI of infant participants

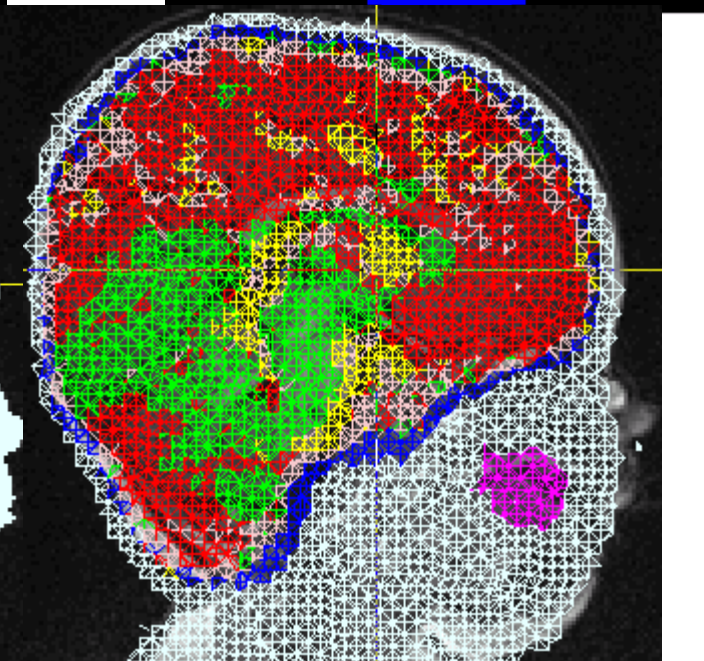
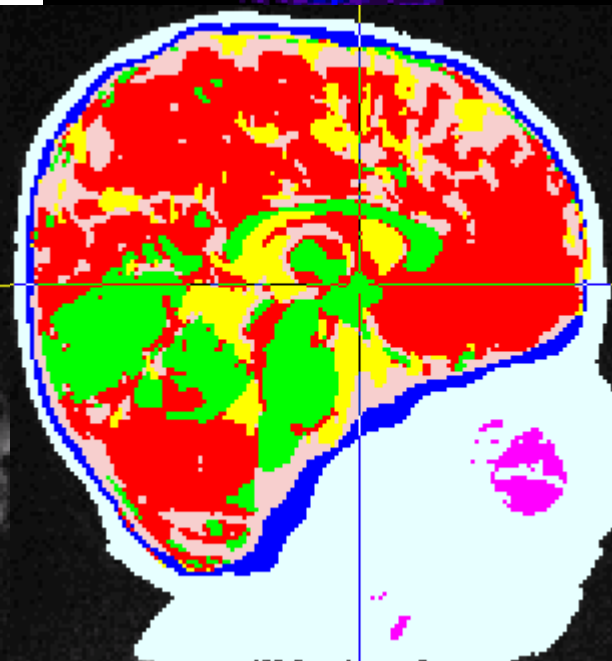
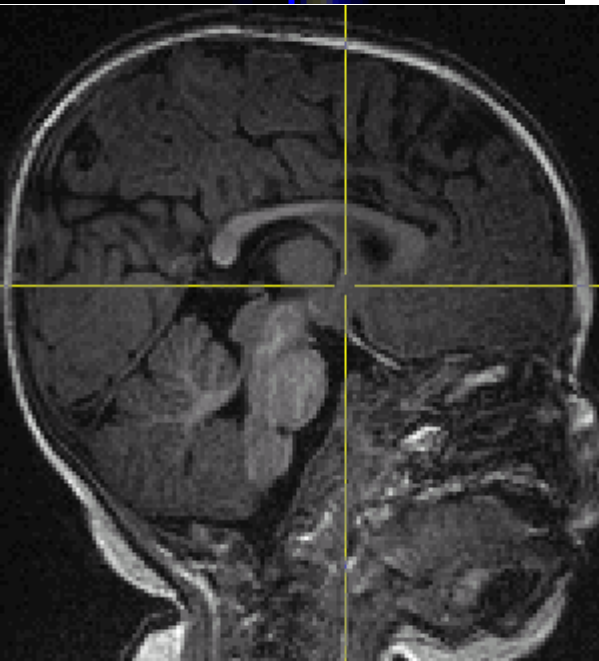
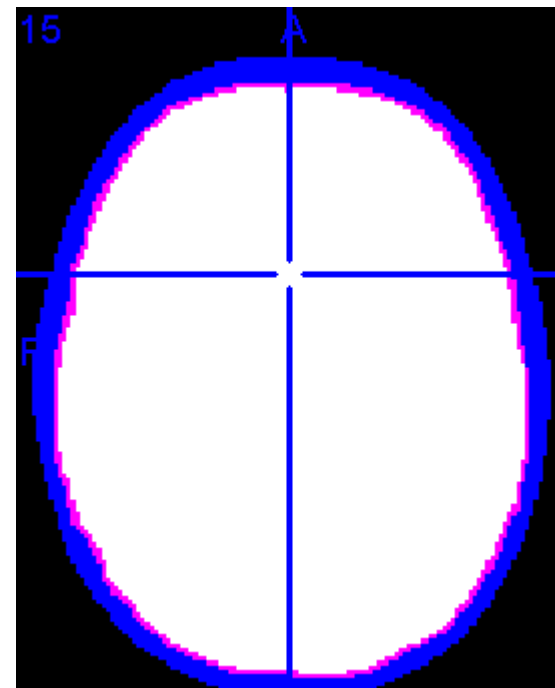
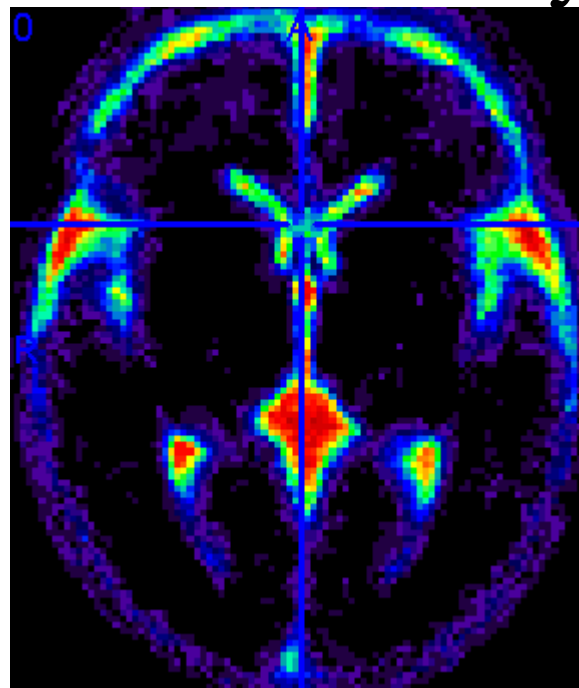
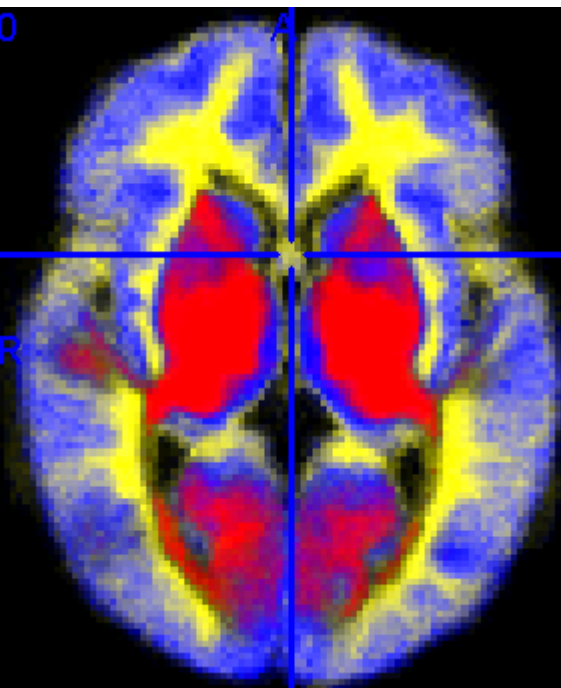


Michael Stevens

Woody Stevens



What's Inside a Baby's Head

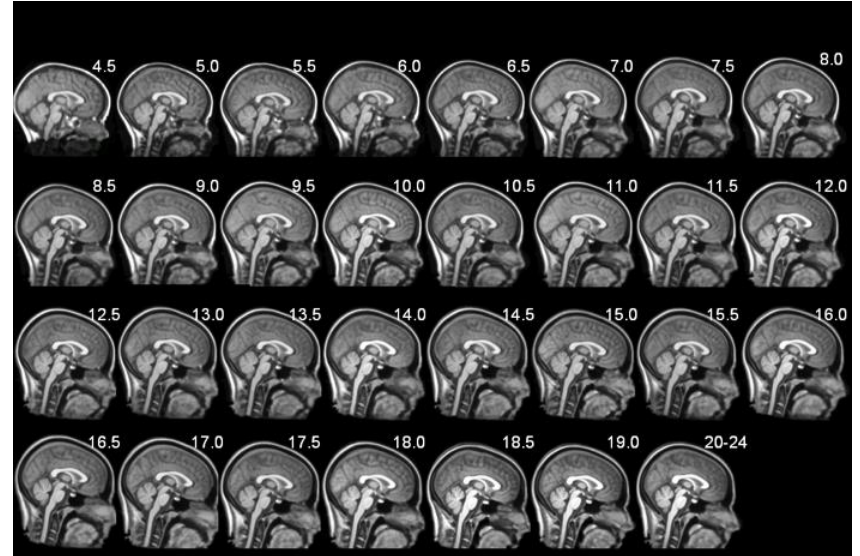
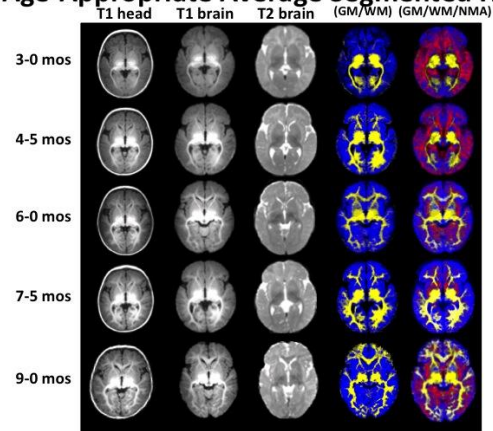


MRI Templates

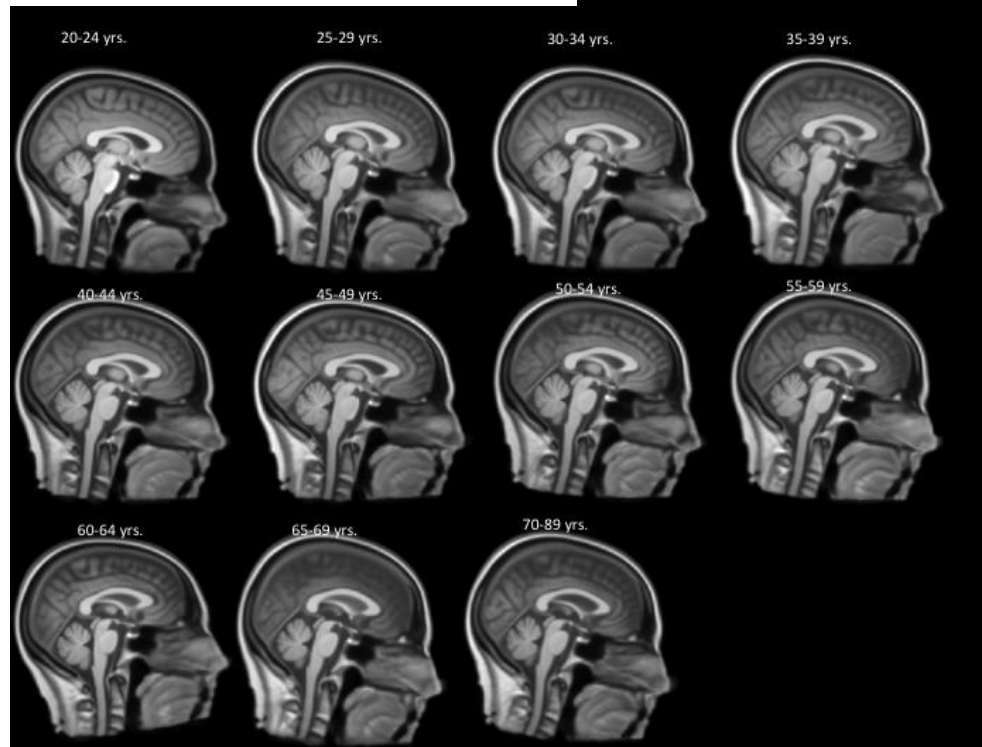


Carmen Sanchez

Age-Appropriate Average Segmented Head



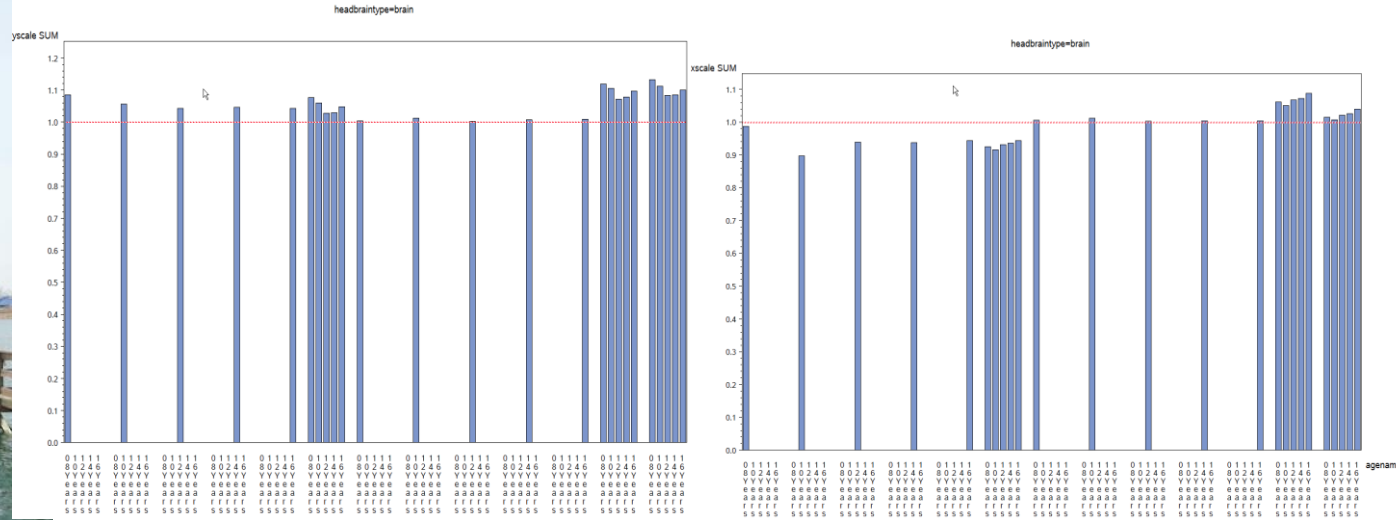
Michelle Phillips



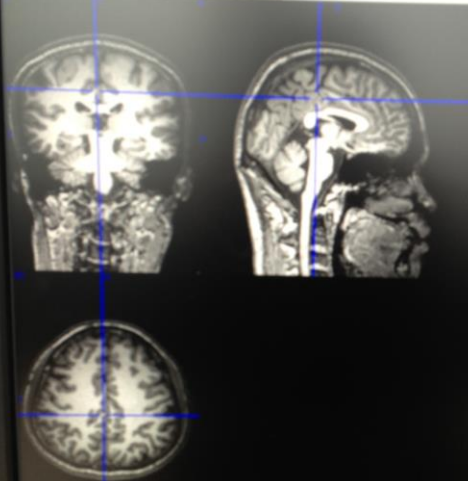
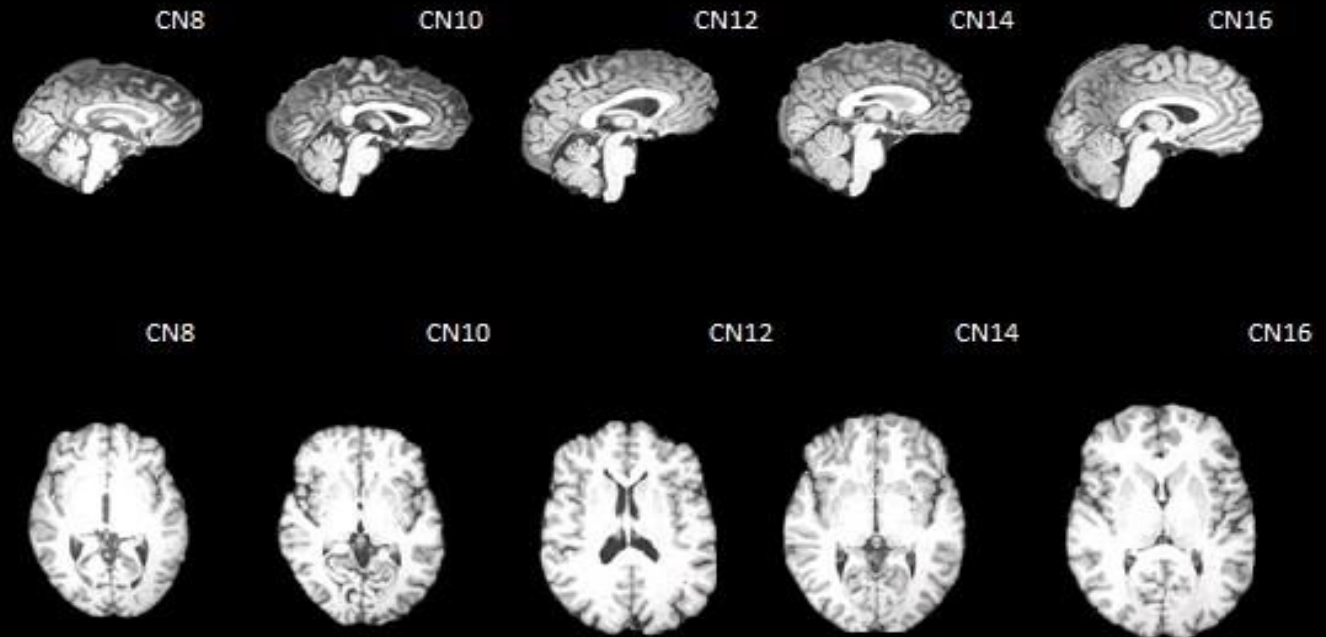
MRI Templates: Chinese Children



Wanze Xie



Chinese-to-Chinese, y- and x- are 1.0; Chinese to US, coronal is smaller, sagittal is larger



MRI Stereotaxic Atlas

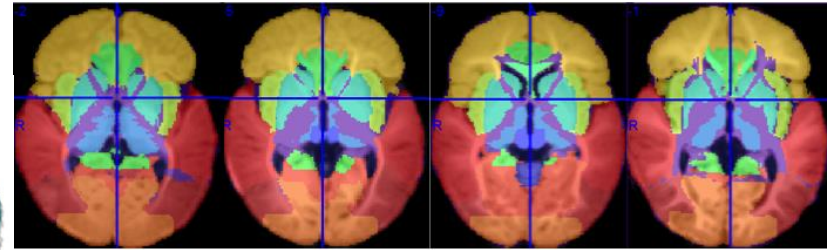
Common Stereotaxic Atlas

3 mos

4-5 mos

6 mos

7-5 mos

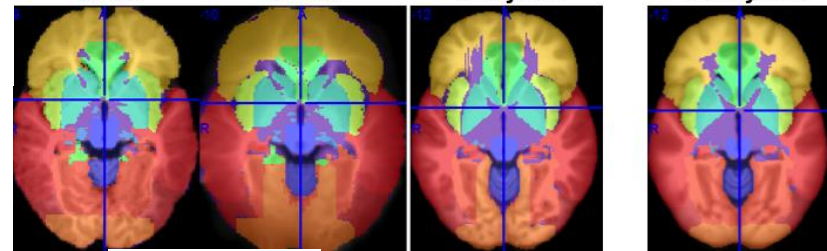


9 mos

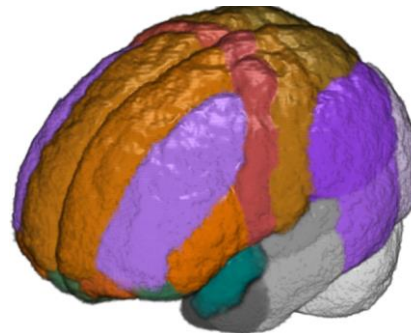
12 mos

12-0 years

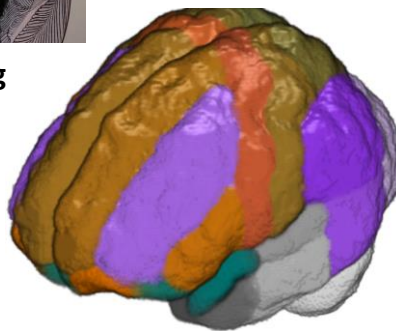
20-24 years



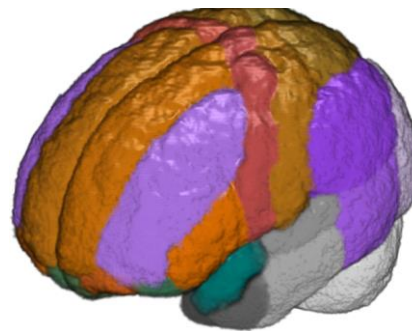
3 Months



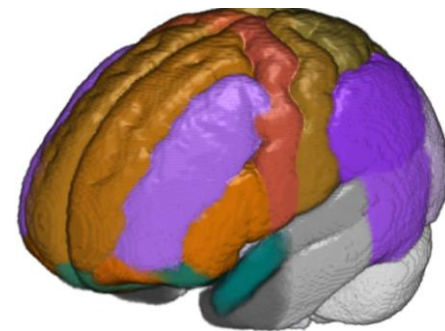
6 Years



12 Years

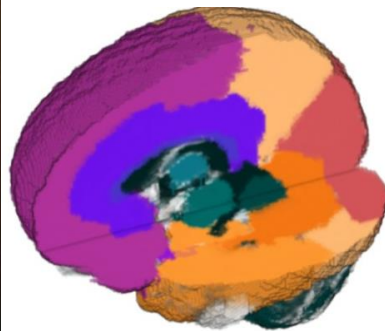


20-24 Years

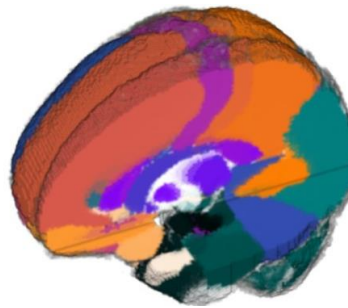


Michelle Phillips

Michael Stevens



Manually drawn atlas
(14 segments)



Computational atlas
(81 segments)



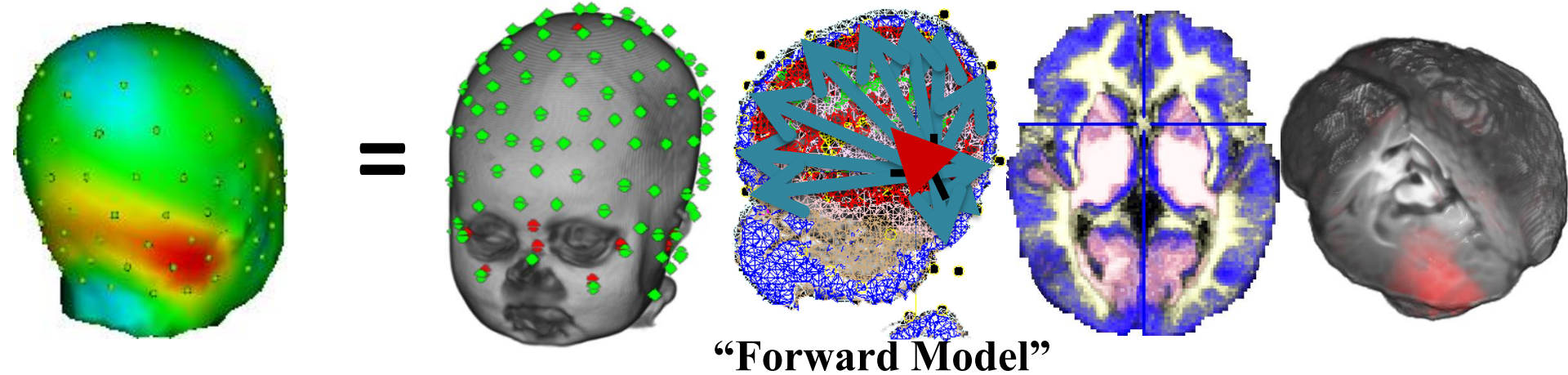
Meagan Bang



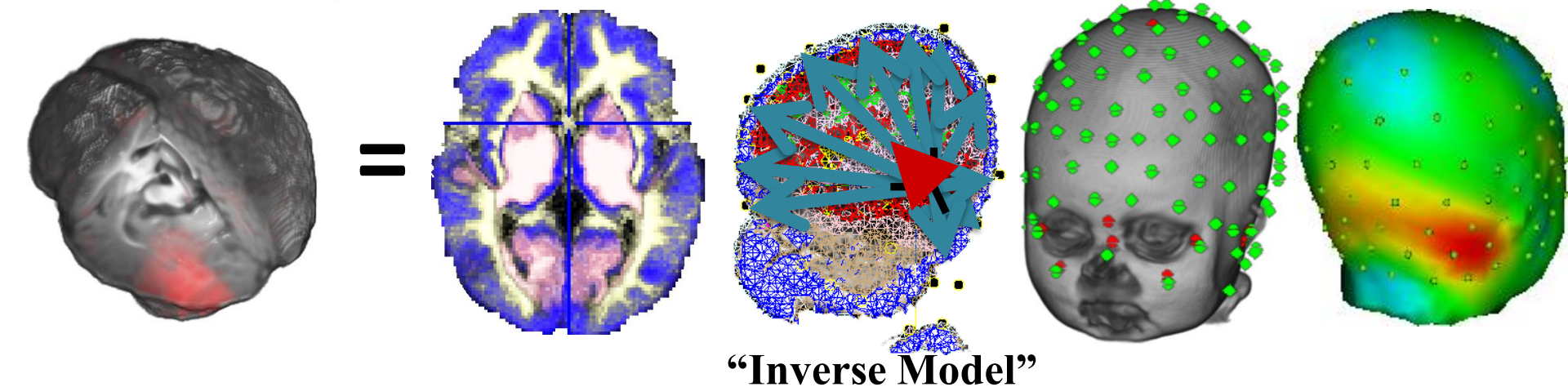
Kelsey Smith

ERP Source Analysis

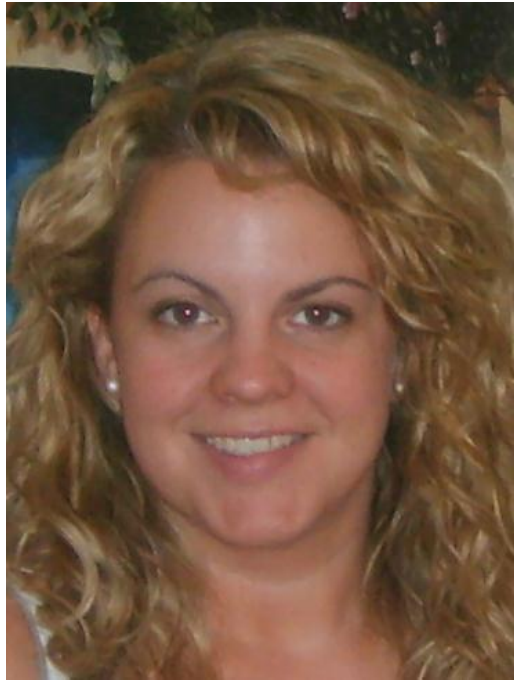
Current generation on scalp, forward model



Recovering sources from scalp current, inverse model



Cortical Sources of Attention to Faces



Nicki Zieber
Michael Stevens

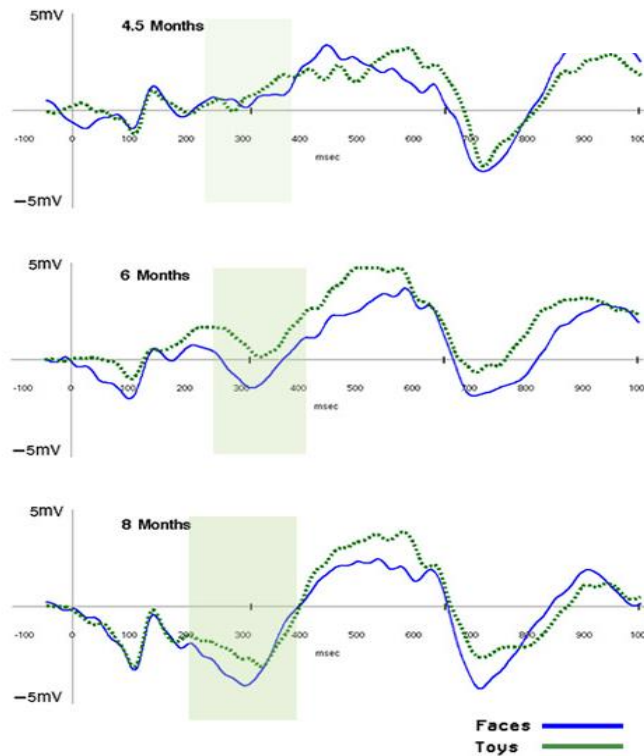
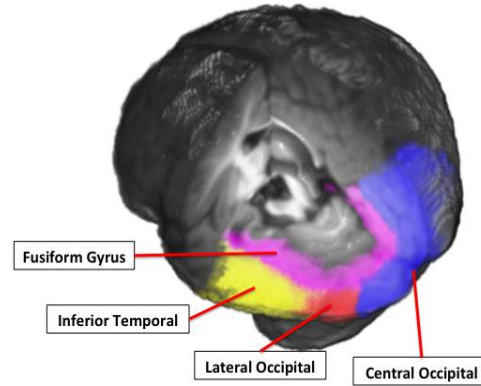
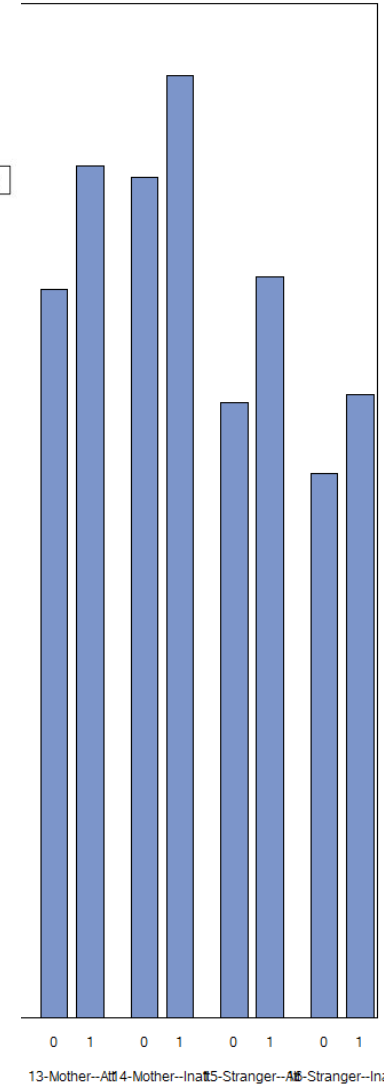


Figure 1. N290 peaks (highlighted areas) for faces and toys for 4.5-, 6-, and 8-month-old infants.



Cortical Sources of Attention to Faces In TD, ASIBS, FXS

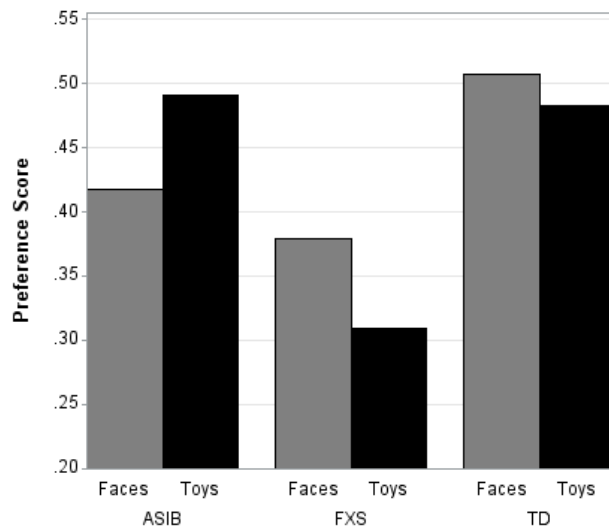
Bridgette Tonnsen

Jane Roberts

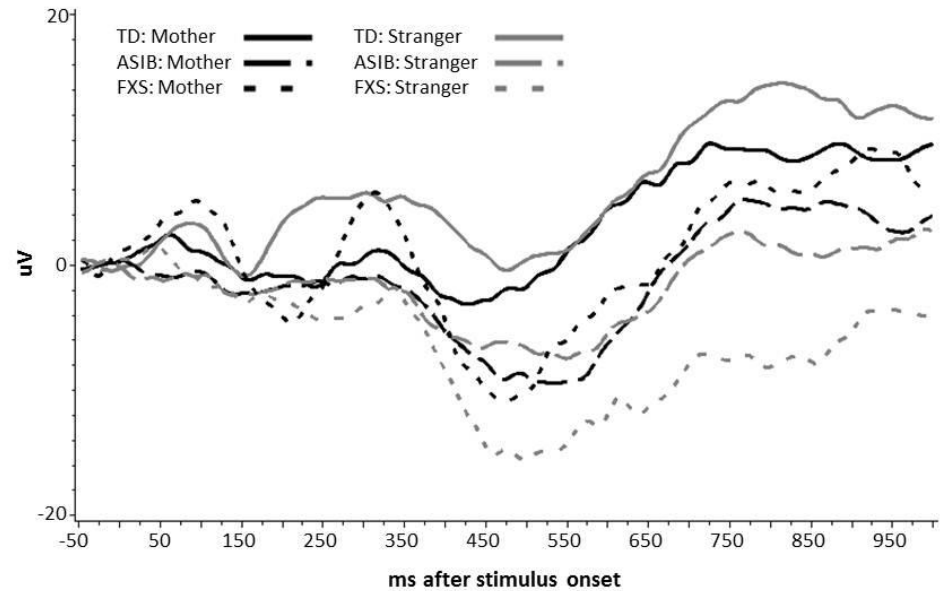
Nicki Zieber

Michael Stevens

Preference Scores by Group



Central Nc Response to Mother and Stranger by Group



Miscellaneous

- 1—Cortical sources of spatial cueing (covert orienting)**
- 2—Development of peripheral stimulus localization**
- 3—Television video viewing from 6 months to 2 years of age**
- 4—Cortical sources of adult eye movement control in the prosaccade / antisaccade task**
- 5—Development of adolescent eye movement control**
- 6—Concurrent ERP and eye-tracking during reading**