



Incidence and Effects of Toxic Stress on Neurodevelopmental, Cognitive and Socioemotional Outcomes in Children and Adolescents: A Cross National Comparative Collaboration

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Background

- ⌘ Toxic Stress affects the architecture of the developing brain during childhood with potential severe short and long-term consequences extending well into adolescence and adulthood (Harvard's Center on the Developing Child, 2014).
- ⌘ Our team uses a Ecobiodevelopmental Framework (EBD) to examine the links between biological and socio-developmental indicators of toxic stress and its associations with impairments in behavior, cognition, and mental health in youth.
- ⌘ This collaborative approach also incorporates innovative neuroimaging technology (MRI) along with behavioral measures.

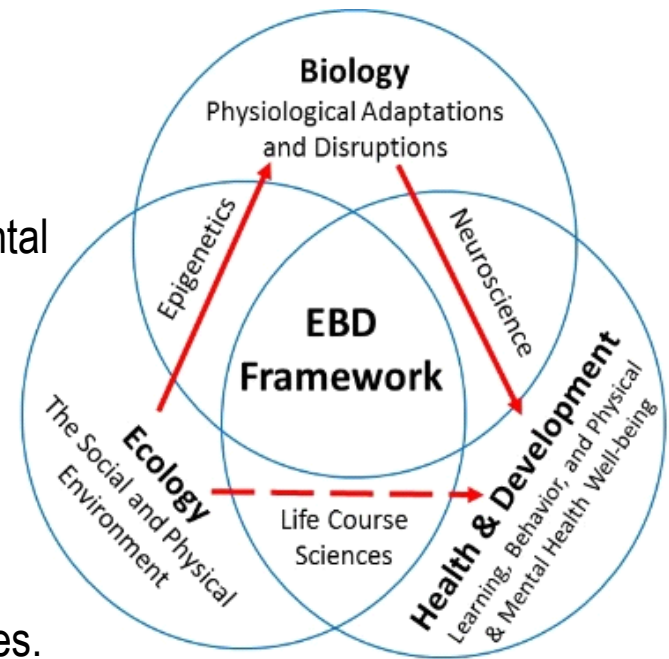


Figure 1. The American Academy of Pediatrics (2012).

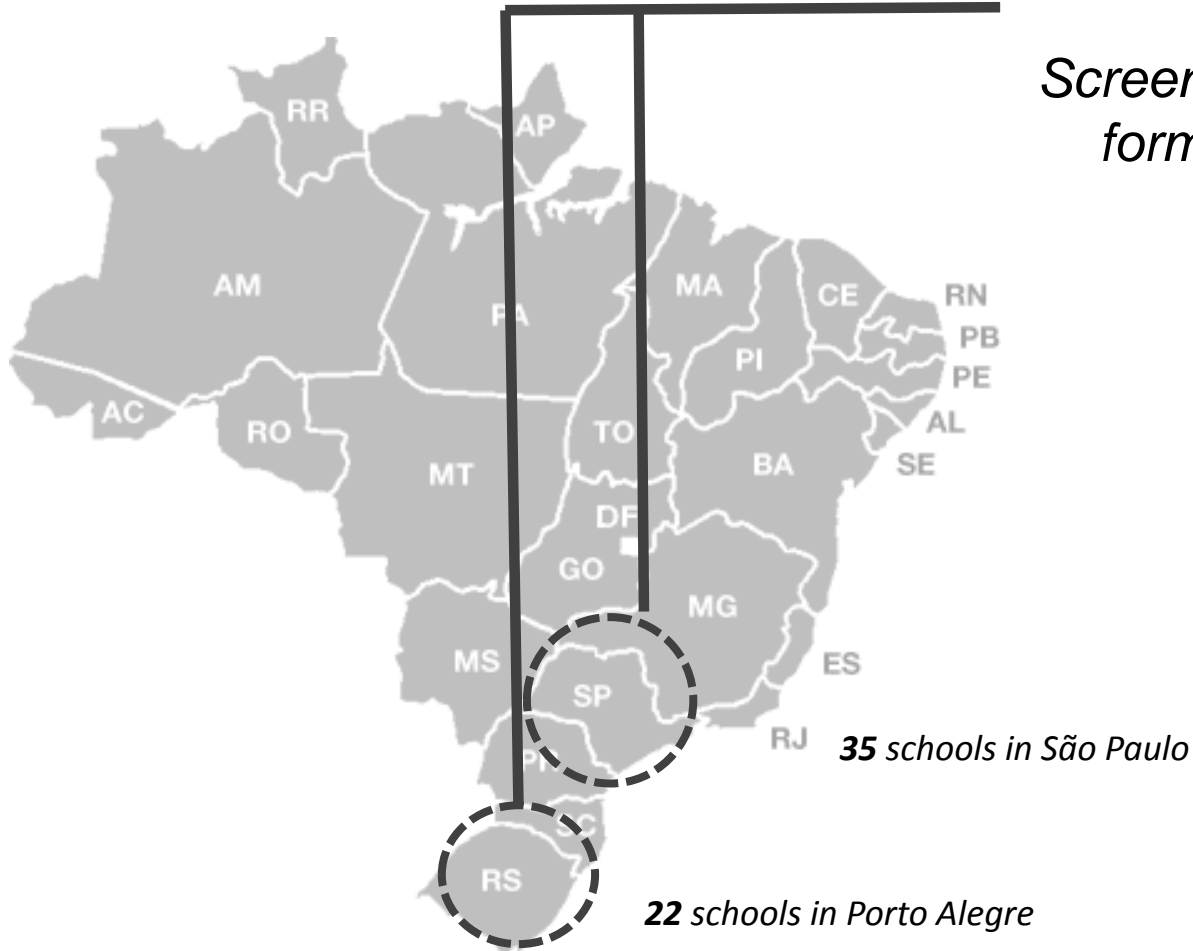
Background

- ⌘ **Toxic Stress**—*unrelieved activation of the body's stress management system due to continuous exposure to strong, frequent, and/or prolonged adversity (e.g., physical-emotional-sexual abuse, neglect, extreme poverty, violence exposure, etc).*
- ⌘ Approximately 6 million of Latin American children suffer some type of abuse and around 80,000 die every year as a result of abuse and neglect in the region (UNICEF, 2014).
- ⌘ The Brazilian Ministry of Health described abuse and neglect in children in 2013 as “*one of the greatest challenges of the century*” as it not only affect youth's and families socio-emotional well-being but also it has a deep effect on the national economy and social costs for the nation (Brasil Ministério da Saúde, 2013; Goursand, Paiva, Zarzar, Ramos-Jorge, Cornacchia, et al., 2012).
- ⌘ According to the U.S. Department of Health and Human Services Administration for Children and Families (2013), over 650,000 children ages 0-18 years old were victims of some type of abuse and/or neglect in the U.S in 2013.

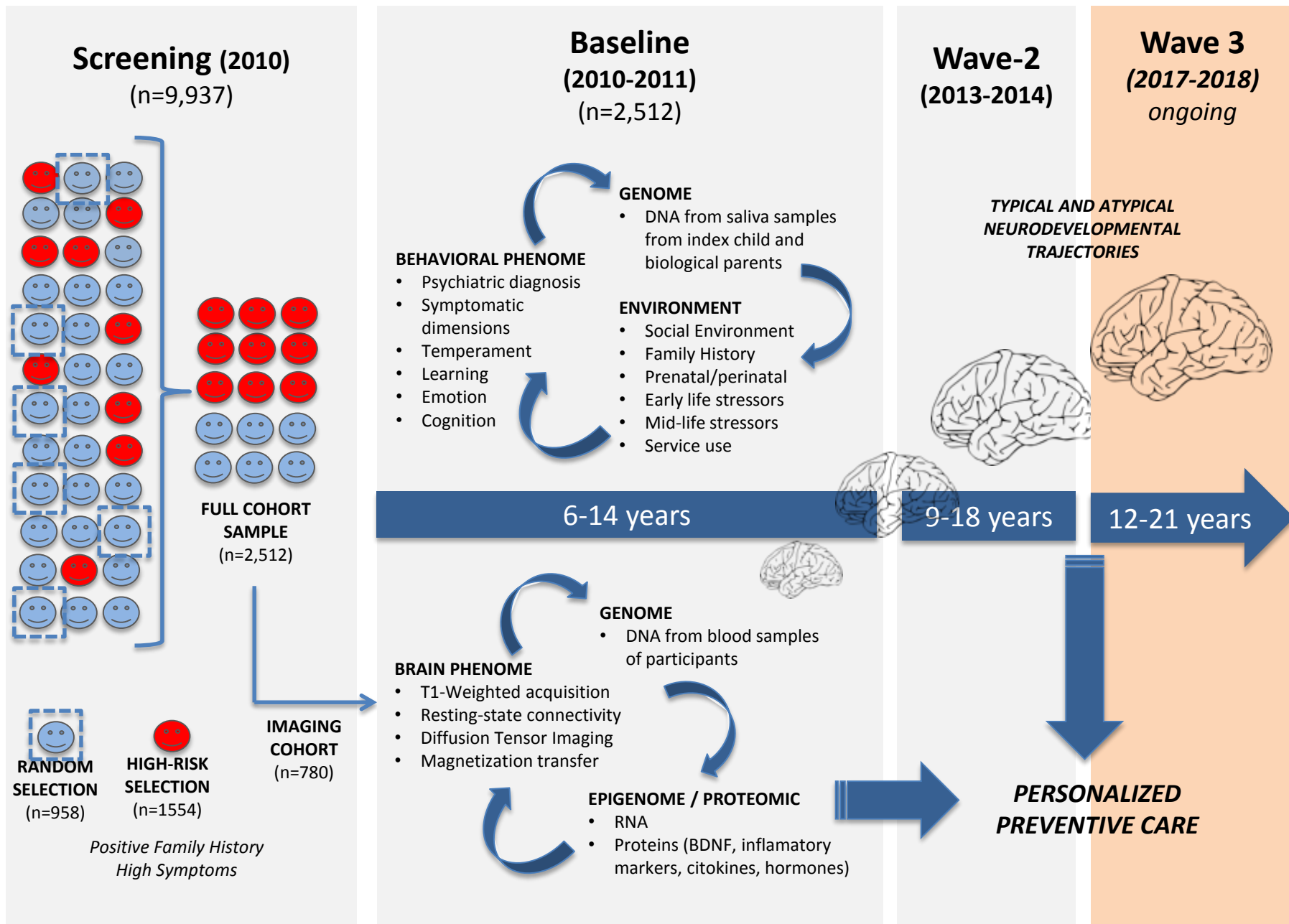
Sample

São Paulo and Porto Alegre

*Screening of 9.937 Children
form 6 to 12 years old*



• **“High Risk Cohort Study for Psychiatric Disorders in Childhood” (HRC) (n=2,512)**

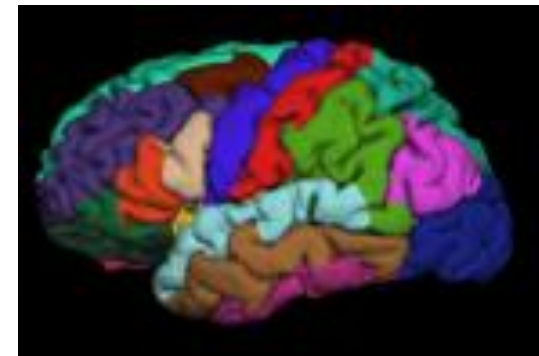
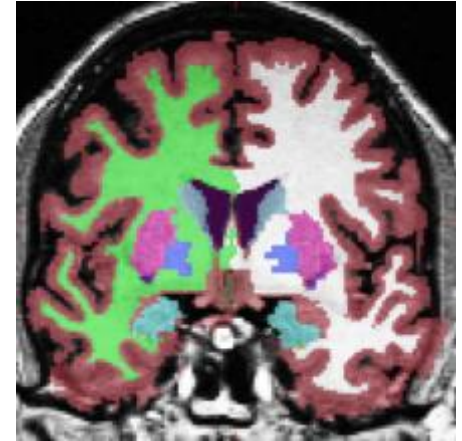


ENRICHED IMAGING COHORT (n=780)

Courtesy Giovanni A. Salum, Salum et al., 2015)

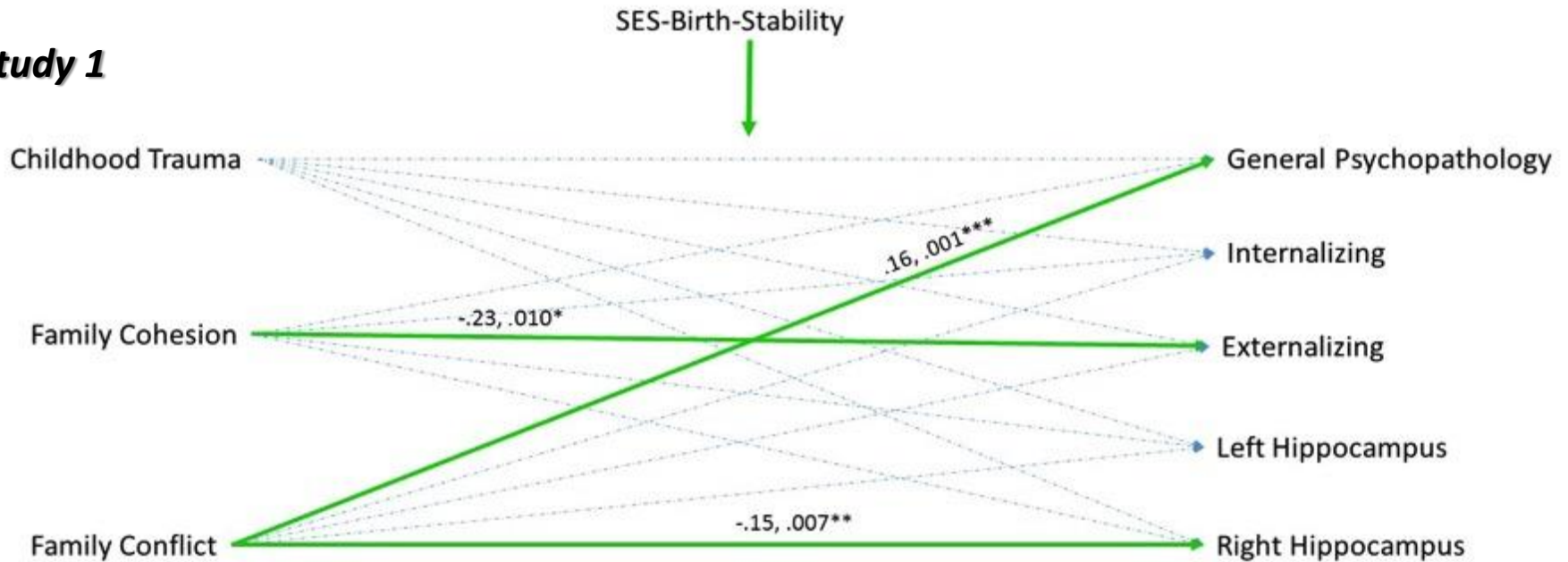
Methods

- ⌘ All parents completed the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) and the Family Environment Scale (FES; Moos & Moos, 1994).
- ⌘ The Brazilian SES scale (Almeida & Wickerhauser, 1991; ABIPEME, 2010) was used to define the SES (low, medium, comfortable).
- ⌘ SES stability measured longitudinal changes in SES from birth until the assessment day and its impact.
- ⌘ Child maltreatment was assessed using a higher order factor model (physical abuse; neglect; emotional maltreatment, and sexual abuse; see Salum et al., 2016).
- ⌘ 677 children and adolescents from 7-14 y/o that presented both high quality MRI and rs-fMRI were analyzed.
- ⌘ Data was processed using FreeSurfer 5.1. Automated volume labeling. Cortical and subcortical volume



Results

Study 1



Study 2

- ⌘ The highest the levels of early life (perinatal stress) the lower is the volume:
 - Subcortical WM ($B=-4304,606$, standard error= $2130,21$; p -value= $0,043$);
 - Right hippocampus direito ($B=-30,564$, standard error= $0,782$; p -value= $0,040$).
 - No effect on cortical nor in left hippocampus volumes.
- ⌘ The highest the levels of late life the lower is the volume:
 - Cortical volume ($B=-3910,28$, standard error= $1986,41$; p -value= $0,049$);
 - Right hippocampus direito ($B=-57,802$, standard error= $16,3944$; p -value <0.001).
 - No effect on WM nor in left hippocampus volumes.

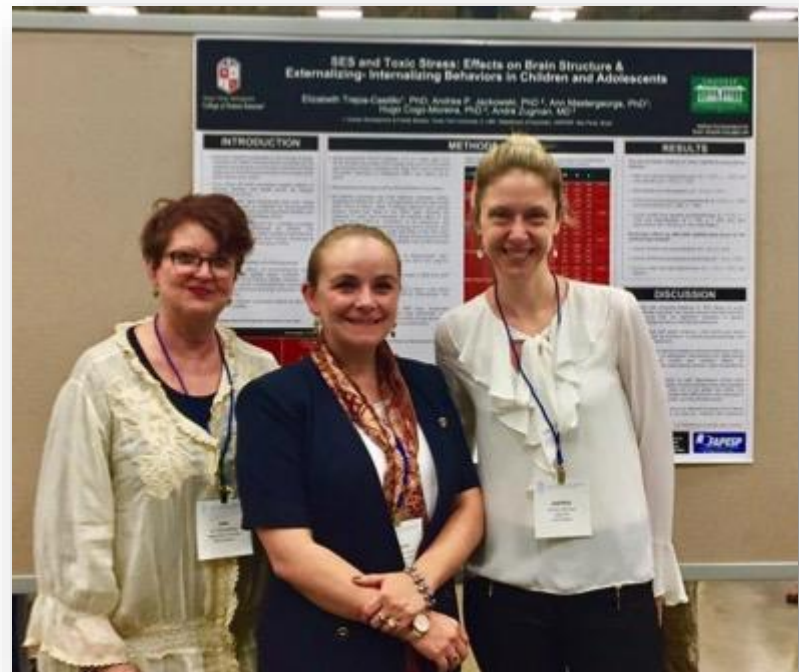
Scholarly Products

Conferences

- ⌘ Biennial Meetings of the Society for Research in Child Development, Austin, Texas-April 2017.
- ⌘ 13th World Congress of Biological Psychiatry-World Federation of Societies of Biological Psychiatry (WFSBP), Copenhagen, Denmark- June 2017.

Grants

- ⌘ Doutorado Sanduiche (Doctoral Dissertation Internship Grant)-*Conselho Nacional de Desenvolvimento Científico e Tecnológico* CNPq (Brazilian National Council for Scientific and Technological Development). Doctoral student (Thabata Bueno de Araújo) in the School of Medicine Doctoral Program in Psychiatry and Medical Psychology at Federal University of São Paulo-Brazil.



Scholarly Products

Papers In- Progress

- ⌘ Trejos-Castillo, E., Jackowski, A.P., & Mastergeorge, A. *SES and Toxic Stress: Effects on Brain Structure and Externalizing- Internalizing Behaviors in Children and Adolescents.*
- ⌘ Jackowski, A.P., *Zugman, A., Trejos-Castillo, E., & Mastergeorge, A. *Brain-behavior Correlation in a High Risk for Psychiatric Disorders Brazilian Cohort: A Replication Study.*

*Graduate Student

Interviews

- ⌘ December 1st 2016 - Texas Tech, Brazilian researchers examine effects of toxic stress on children's brain development (<http://today.ttu.edu/posts/2016/12/toxic-stress>)
- ⌘ December 21st 2016 - US and Brazilian researchers study toxic stress in children (<http://agencia.fapesp.br/us-and-brazilian-researchers-study-toxic-stress-in-children/24636>)
- ⌘ December 31st 2016 - Pesquisadores de SP e Texas estudam causas do estresse crônico em crianças (<http://agenciabrasil.ebc.com.br/pesquisa-e-inovacao/noticia/2016-12/pesquisadores-de-sp-e-texas-estudam-causas-do-estresse-cronico>)
- ⌘ April 12 2017 - Estresse Tóxico em Crianças e Adolescentes (<http://genmedicina.com.br/2017/04/12/estresse-toxico-em-criancas-e-adolescentes>).

Future Activities

⌘ Papers & Conferences

- 2 research papers already presented at National/International Conferences.
- 2 additional conference presentations for Biennial Meetings of the Society for Research on Adolescence, Minneapolis, MN- April 2018
- SRCD Monograph Submission

⌘ Collaborations

- Institute for Measurement Methodology, Analyses and Policy (IMMAP)

⌘ Grants In-Progress

- *Partnerships for International Research and Education (PIRE) NSF 16-571 / Brazil: The Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP)*. Due date: Early Spring 2018
- NIH-FOGARTY Global Brain and Nervous System Disorders Research Across the Lifespan (R21)
- *International Research Experiences for Students (IRES) NSF 12-551*: this program supports development of globally-engaged U.S. students capable of performing in an international research environment. Due date: Early Spring 2018

Thank You!

Muito Obrigada!