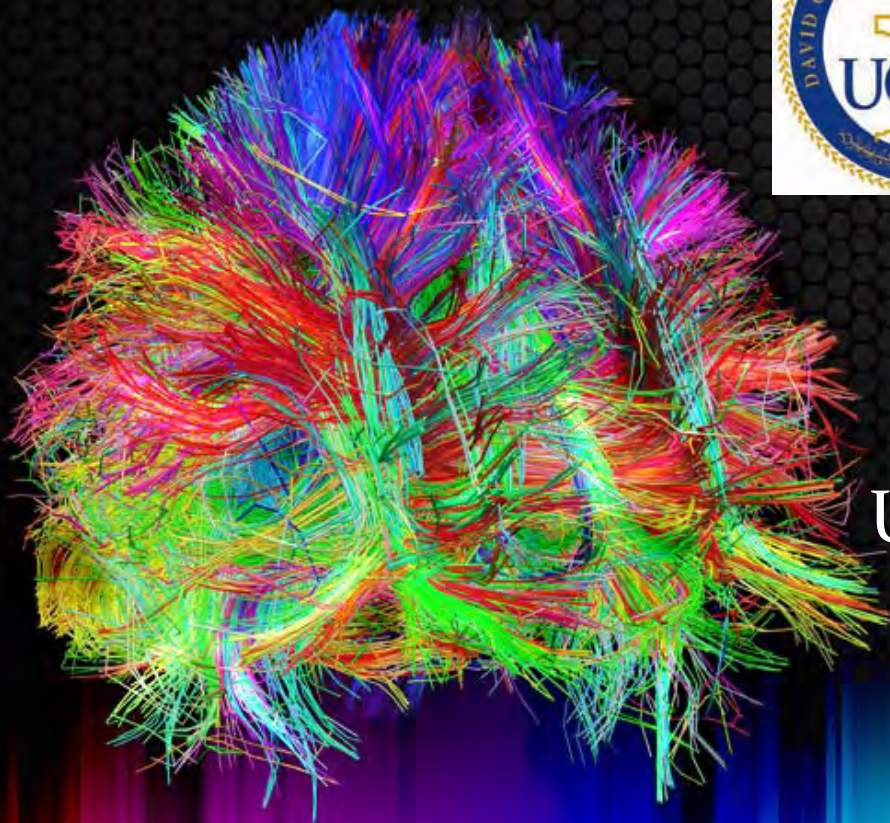


Patient-tailored longitudinal quantification of brain atrophy in TBI and CTE using multimodal neuroimaging



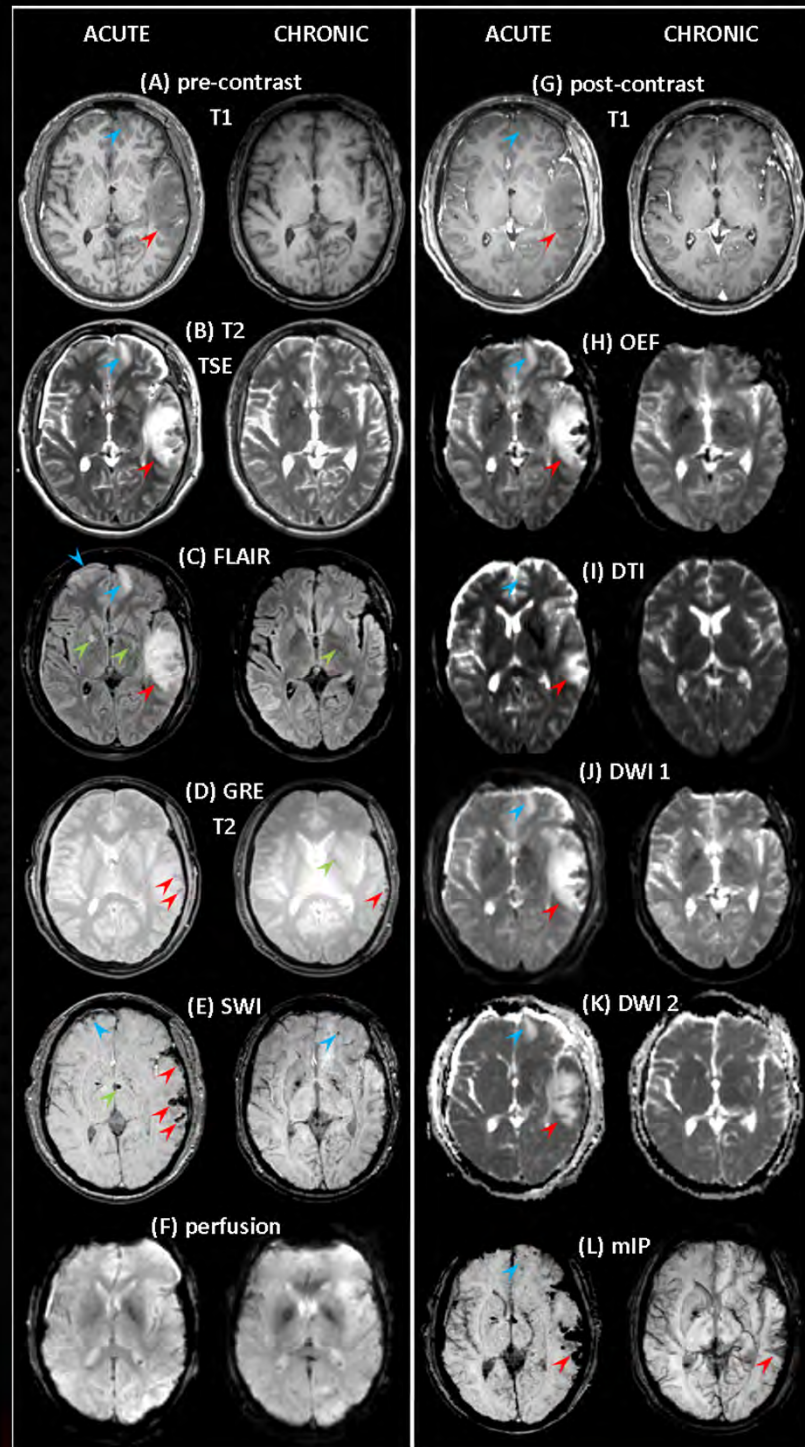
Andrei Irimia, Ph.D.
Laboratory of Neuro Imaging
University of California, Los Angeles



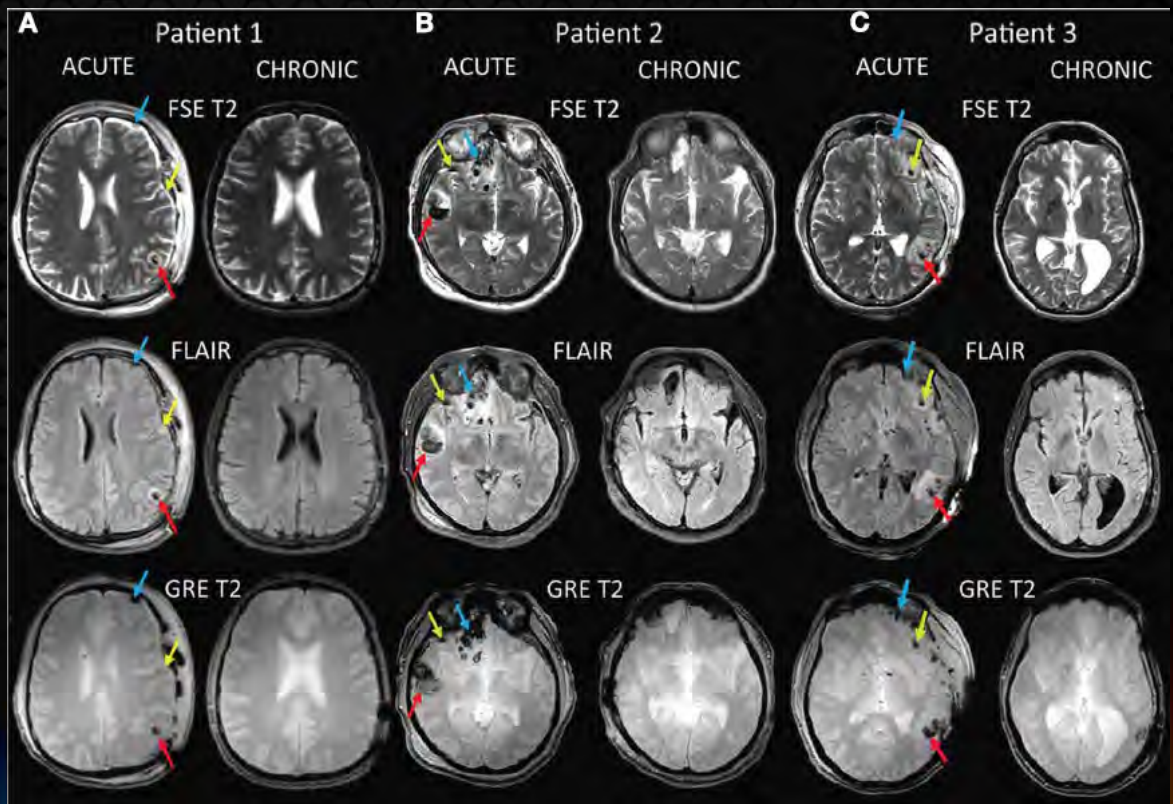
LONI

Laboratory of Neuro Imaging, UCLA

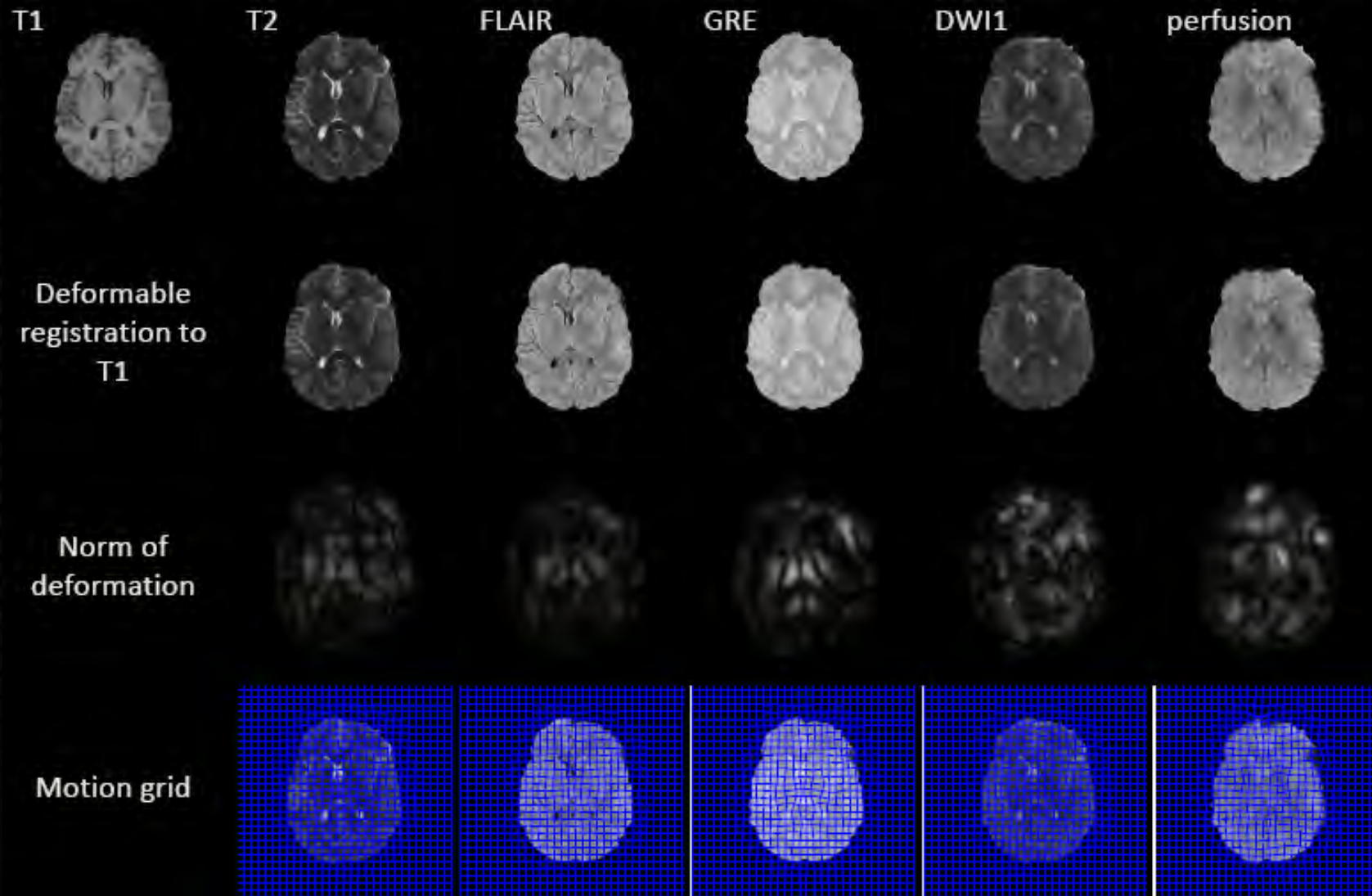




Longitudinal neuroimaging of TBI and CTE using multimodal MRI



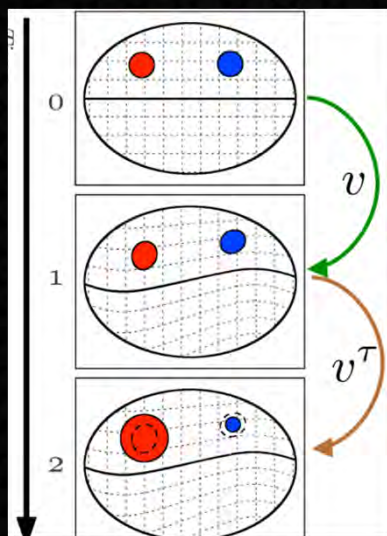
TBI/CTE Multimodal Registration



Yifei Lou, Allen Tannebaum et al. (Boston Univ, Georgia Tech, UC San Diego)

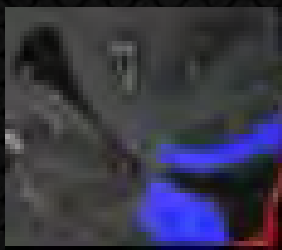
Geometric 'metamorphosis'

Joint estimation of global background & pathology deformation

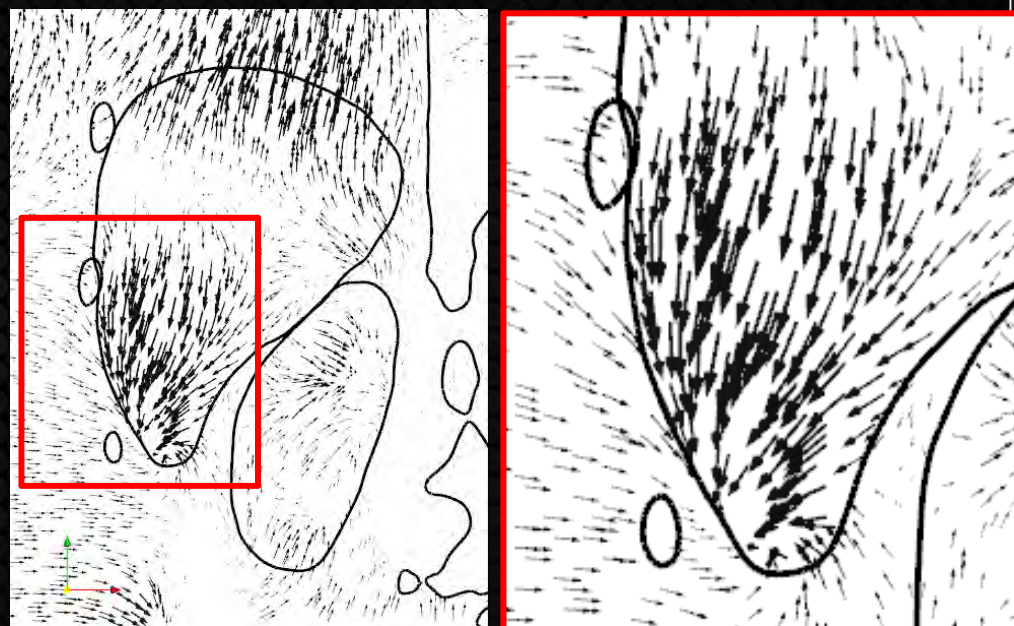


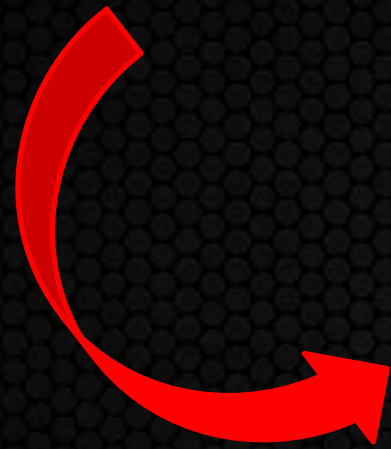
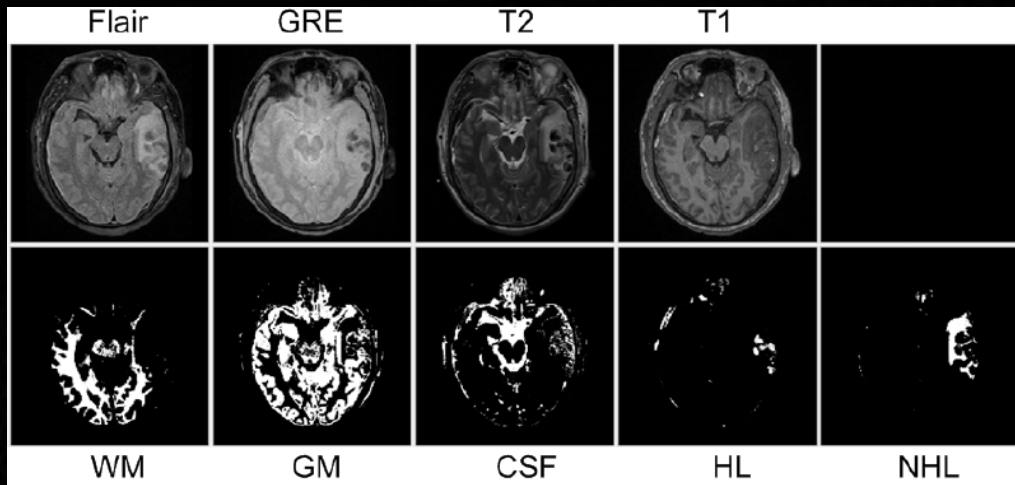
global background motion

pathology grows or contracts

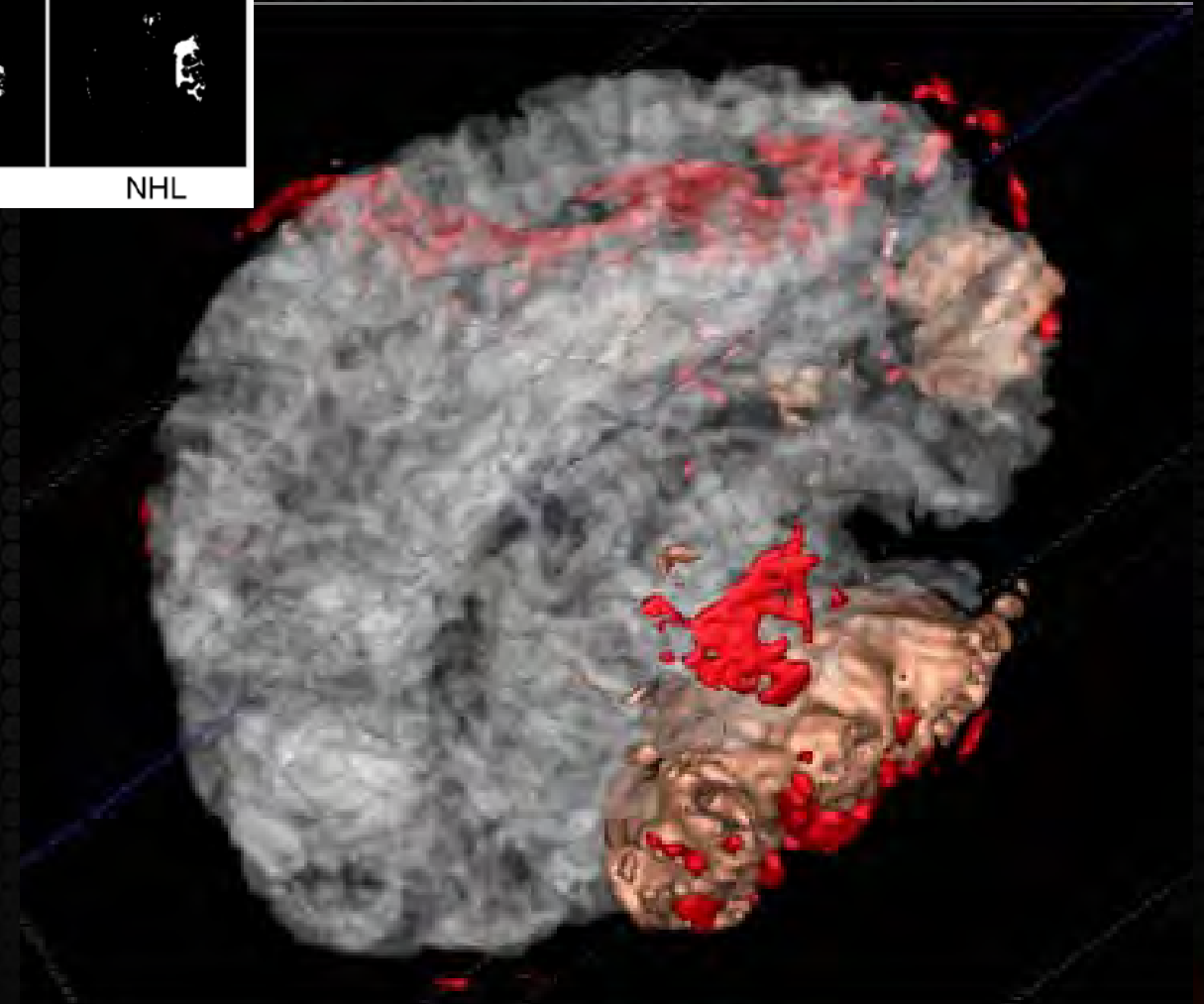


Registration of sliding anatomical structures



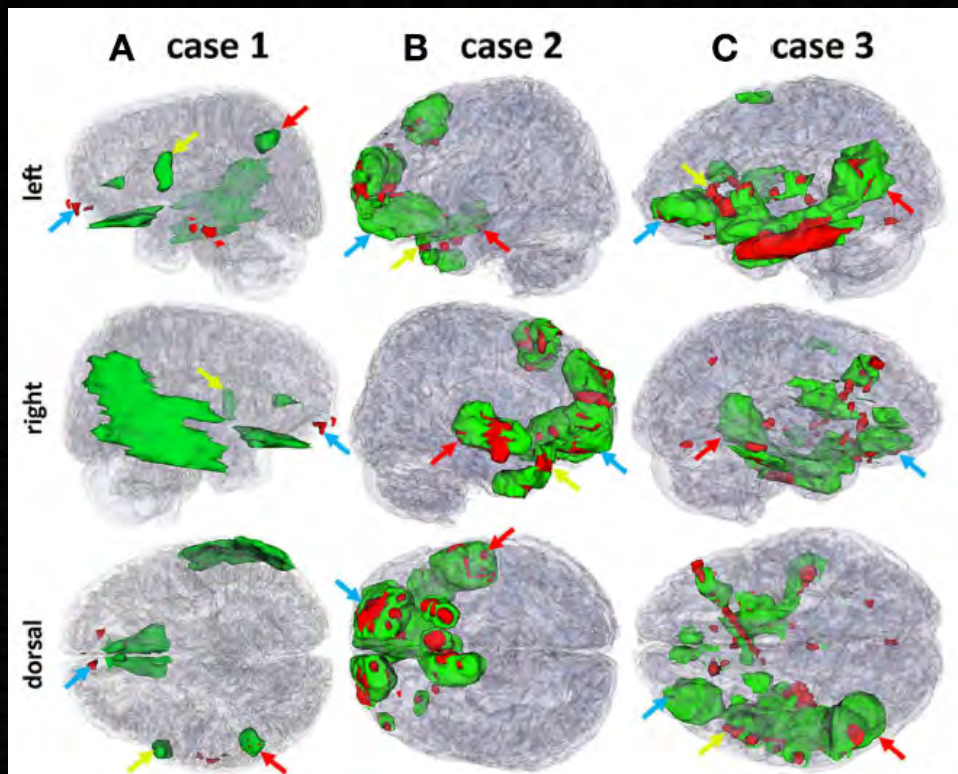


**Personalized
Atlas Construction
for TBI & CTE**

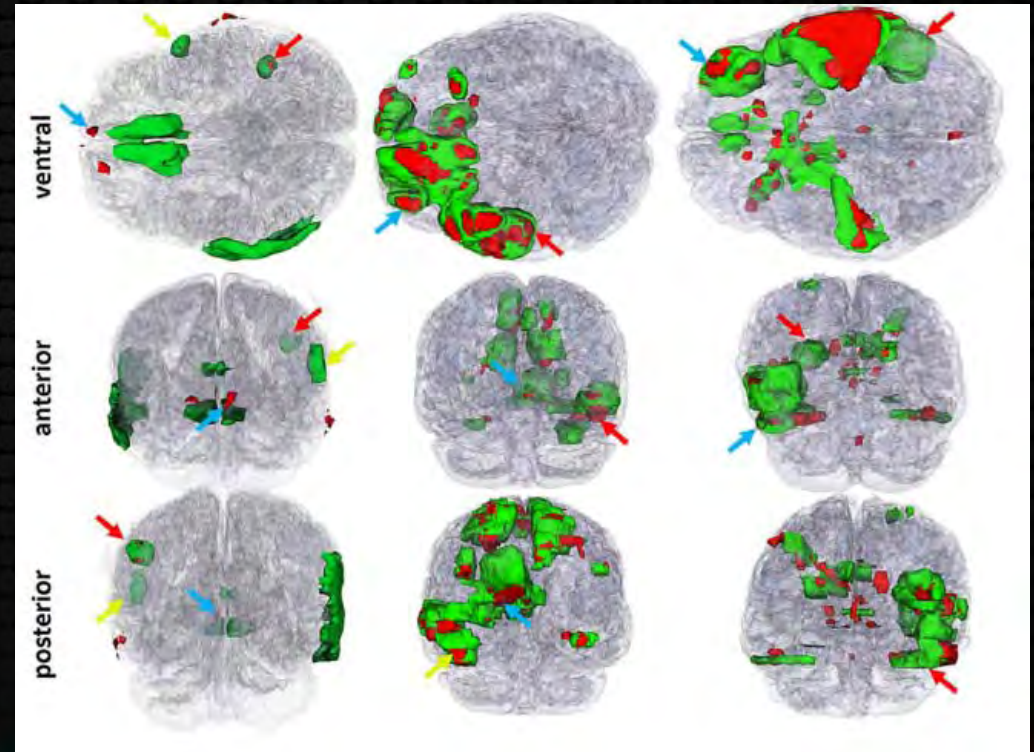


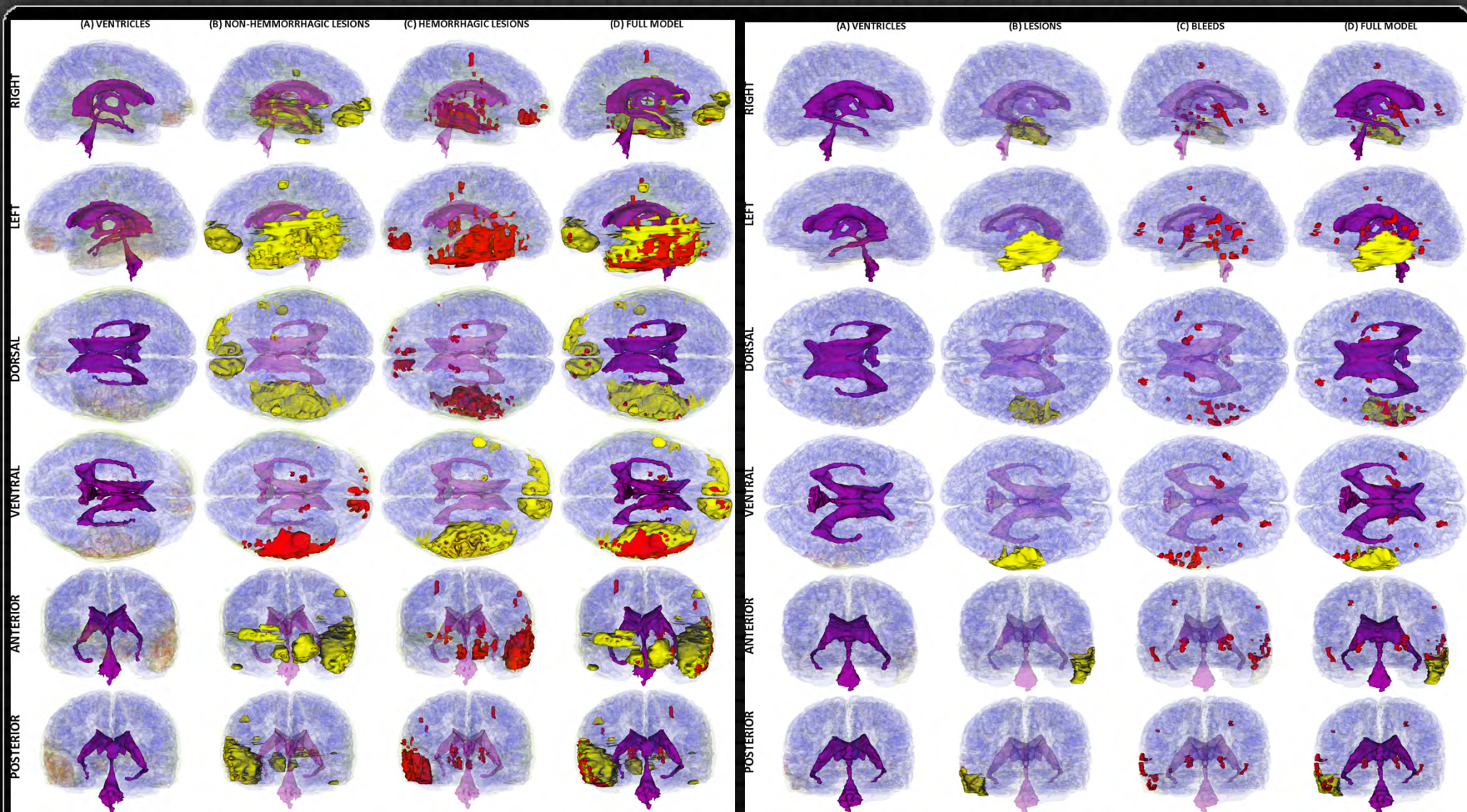
3D Lesions

3D models of pathology



edema
hemorrhage





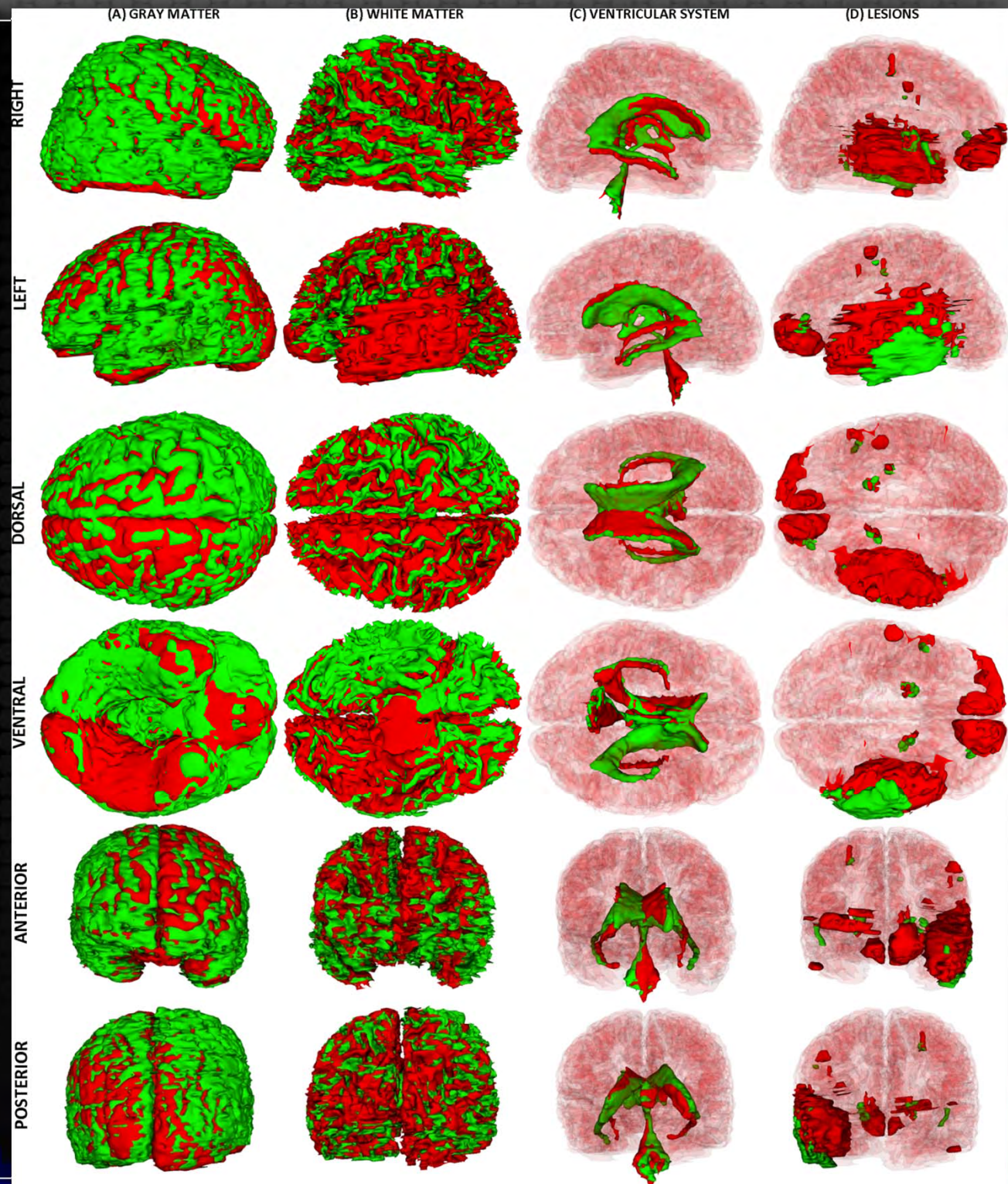
ventricular system

edema

hemorrhage

longitudinal analysis

 acute
 chronic



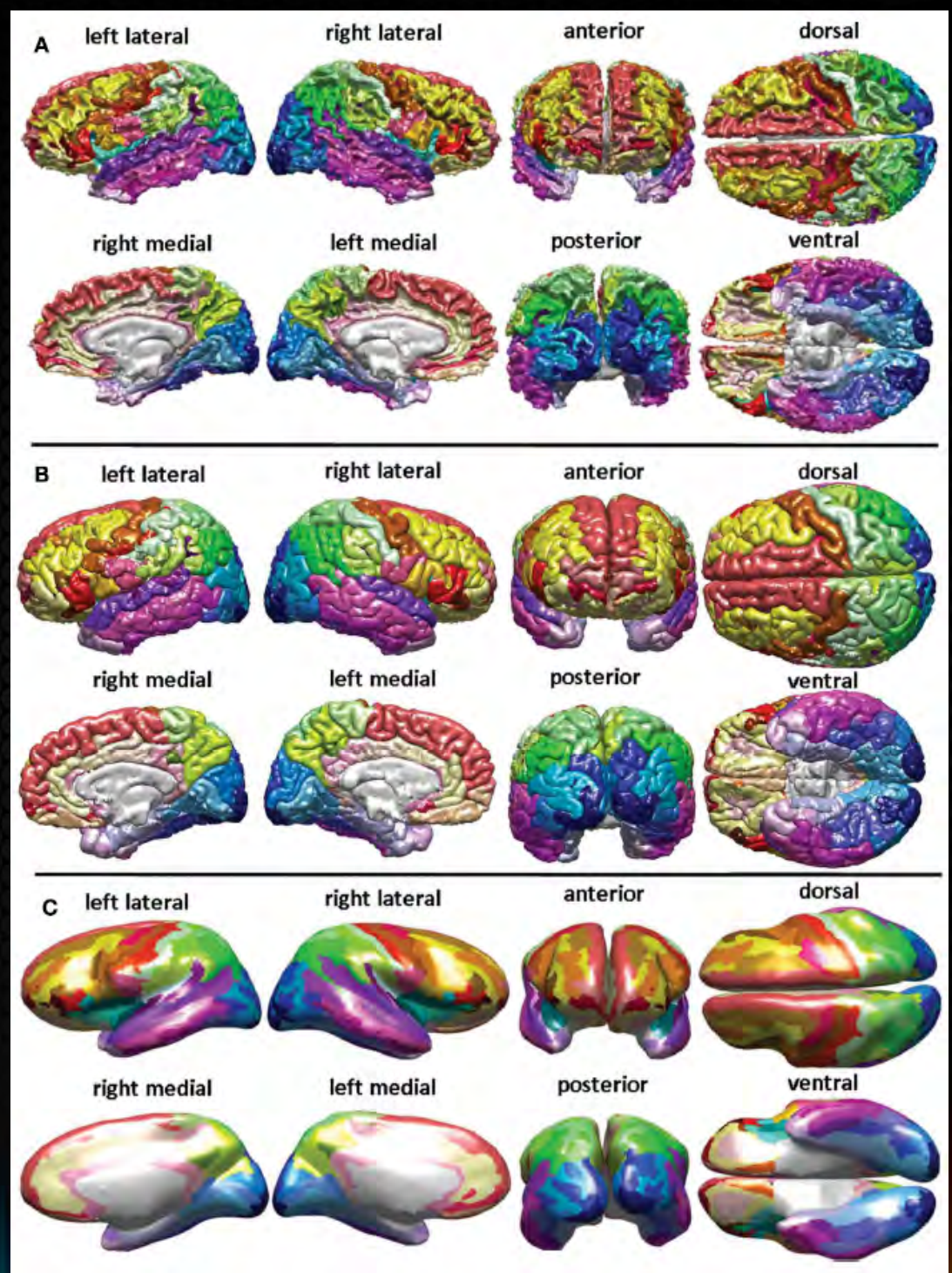
automatic segmentation
of gray and white matter

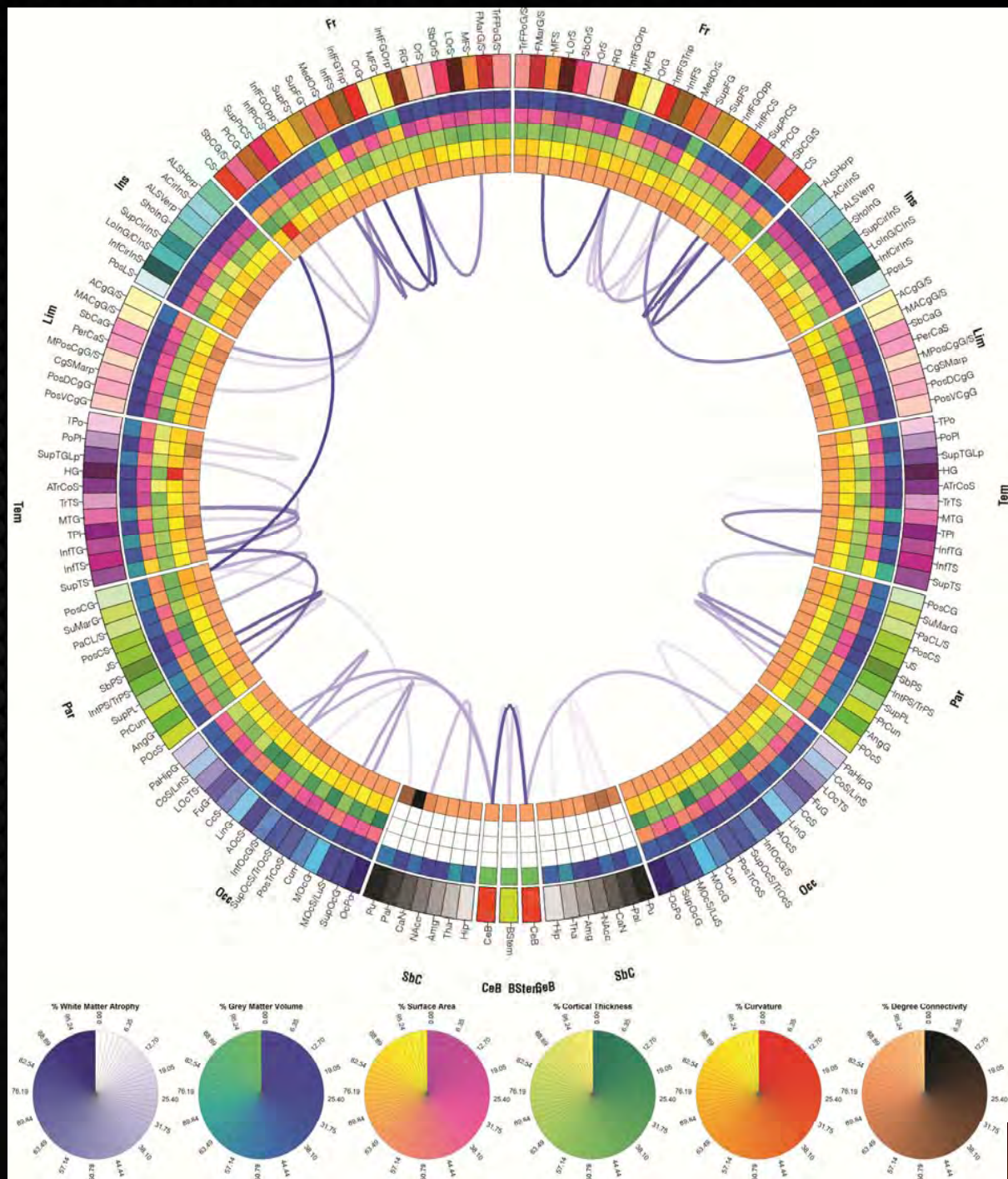
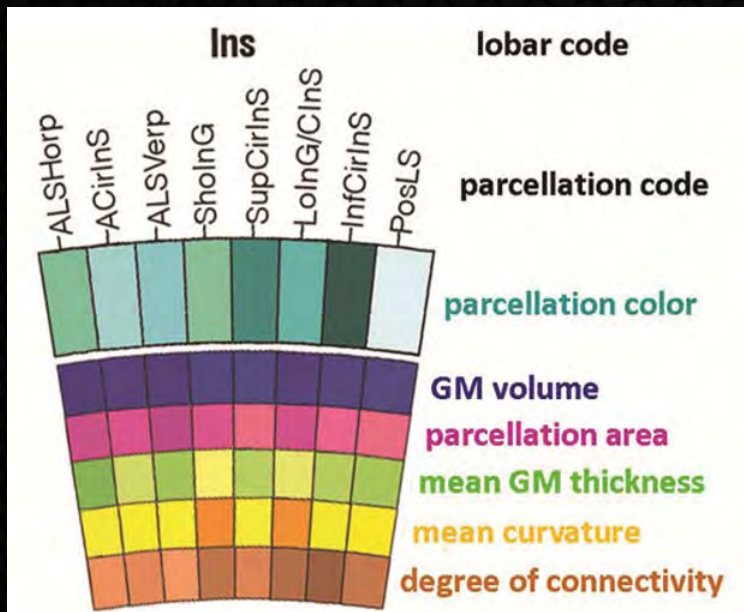


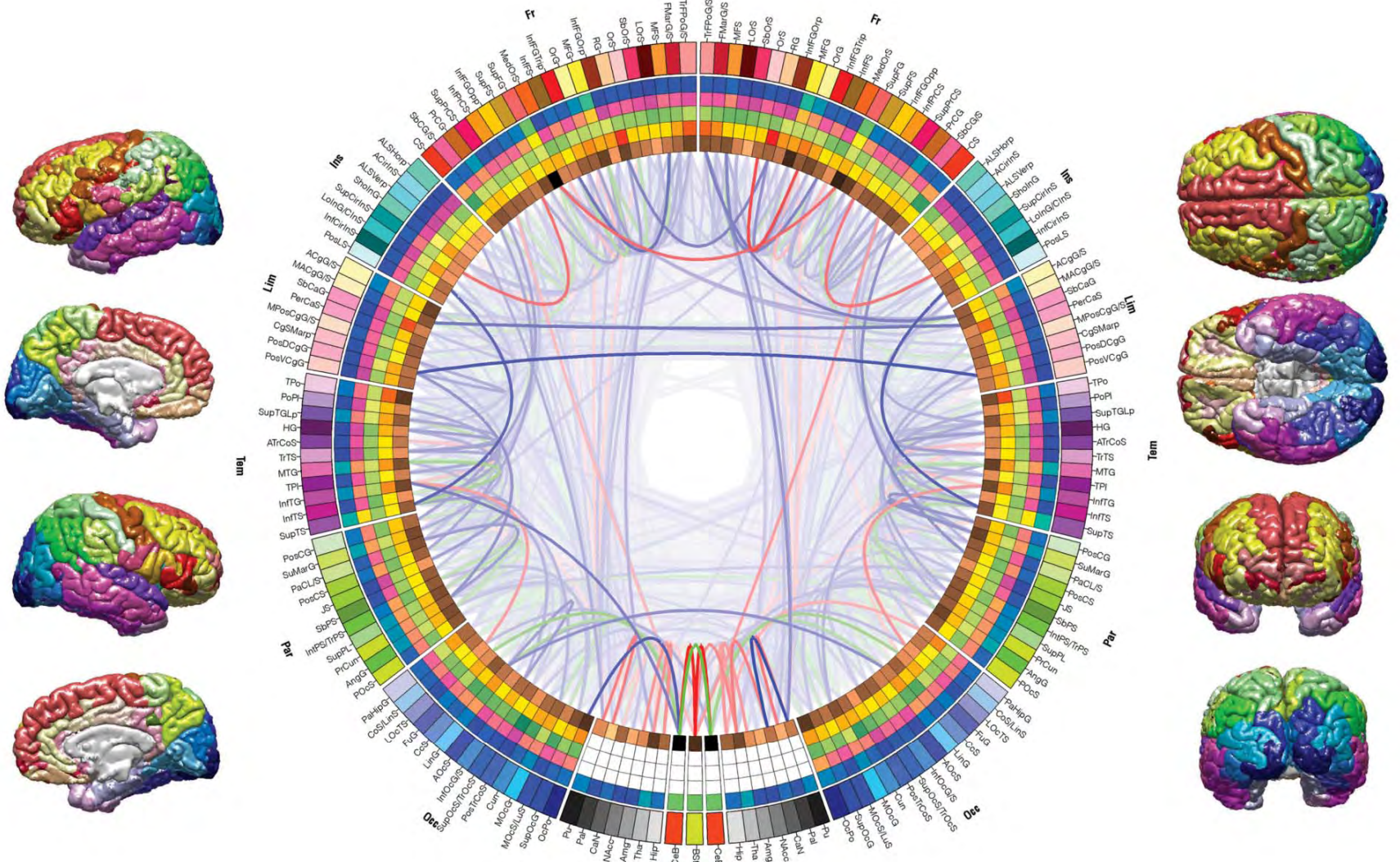
atlas-based parcellation
of gyral and sulcal structures



generation of 3D
cortical models

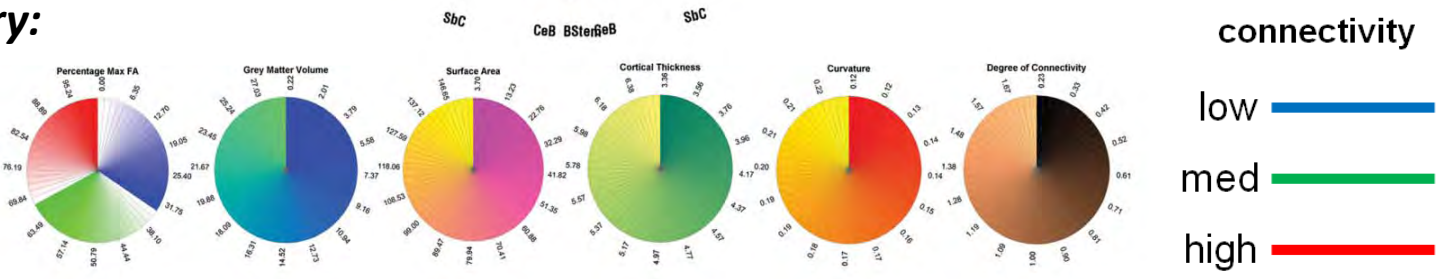






Sample Summary:

N=100
 right handed
 Healthy males
 25-36 years old





Patient-tailored connectomics visualization for the assessment of white matter atrophy in traumatic brain injury

Andrei Irimia¹, Micah C. Chambers¹, Carinna M. Torgerson¹, Maria Filippou², David A. Hovda², Jeffrey R. Alger³, Guido Gerig⁴, Arthur W. Toga¹, Paul M. Vespa², Ron Kikinis⁵ and John D. Van Horn^{1*}

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Mentors and Collaborators



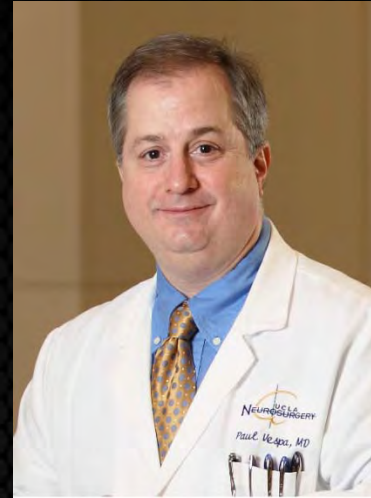
Jack Van Horn
UCLA



Arthur Toga
UCLA



David Hovda
UCLA



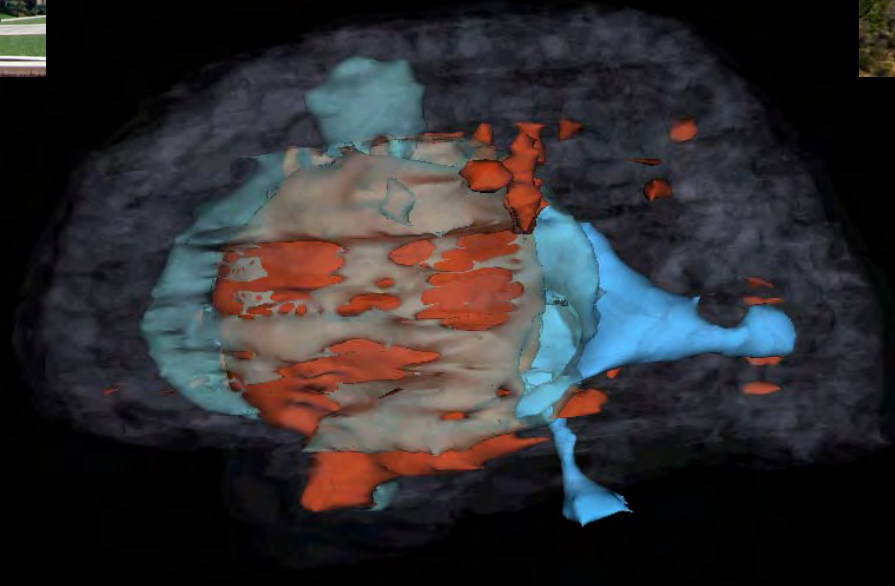
Paul Vespa
UCLA



Ron Kikinis
Harvard Medical School

- **UCLA:** Micah Chambers MS, Maria Filippou MD, Jeffrey Alger PhD, Matthew Goh BS
- **University of Uta:** Guido Gerig PhD, Marcel Prastawa PhD, Bo Wang PhD, Sylvain Gouttard PhD
- **Harvard Medical School:** Sonja Pujol PhD
- **UNC Chapel Hill & Kitware, Inc.:** Stephen Aylward PhD, Danielle Pace PhD
- **UCSD:** Yifei Lou, PhD
- **Georgia Tech:** Patricio Vela, PhD
- **Boston University:** Allen Tannenbaum, Ph.D.
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Thank you

