Fundamental Neuroscience for Neuroimaging

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Course Goal

Course goal:

To provide an overview of neuroscience topics relevant to the collection, analysis and interpretation of neuroimaging data.
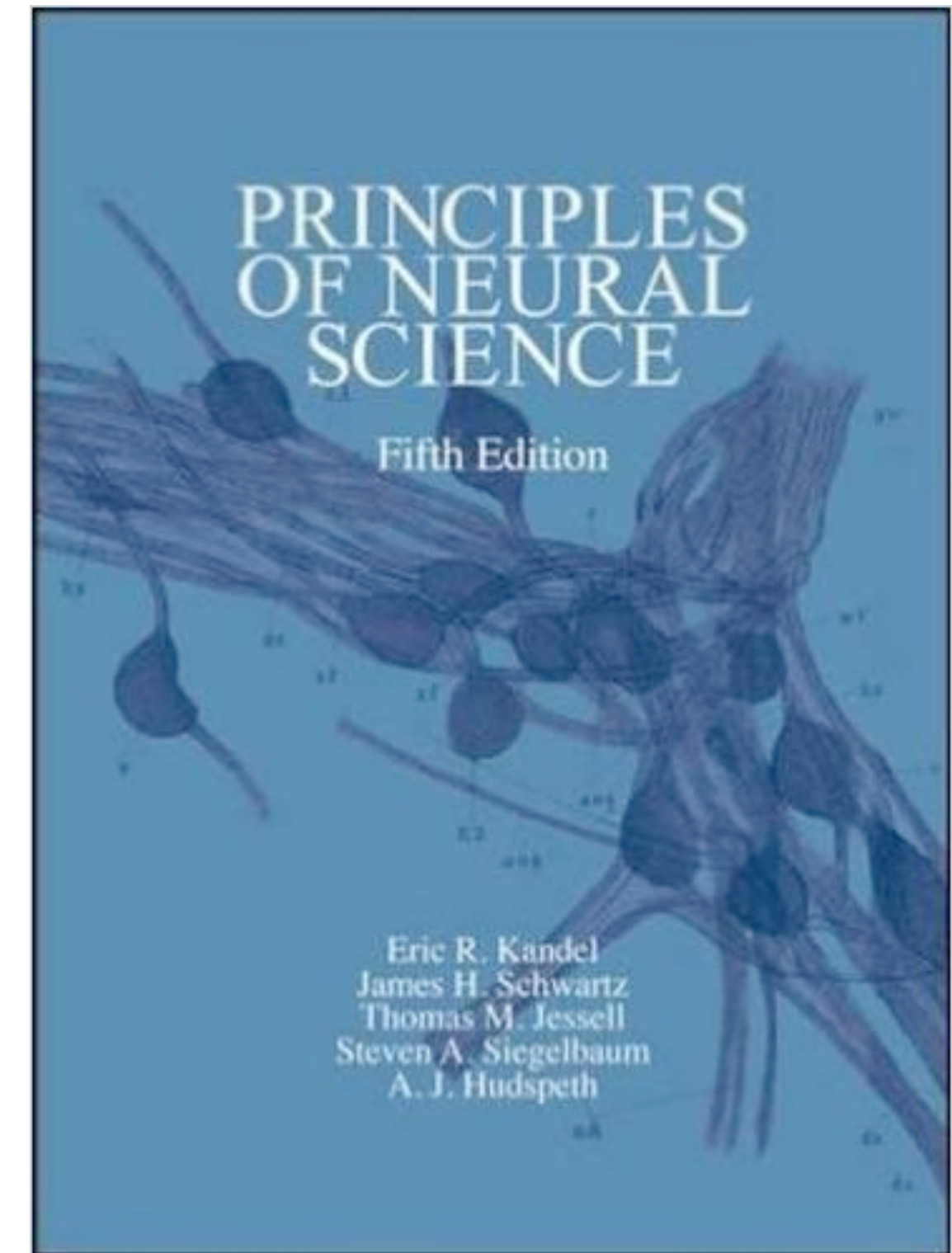
Course Topics

Course topics:

- Structural and functional organization of the brain

- Terminology in brain organization

- Brain networks and communication in the brain

- Cognition and cognitive domains

- Principles of Magnetic Resonance Imaging

- Experimental design and neuroimaging studies

- Applications of neuroimaging methods

Course Topics

Neuroscience:

- Cell and molecular biology of the neuron

- Synaptic transmission
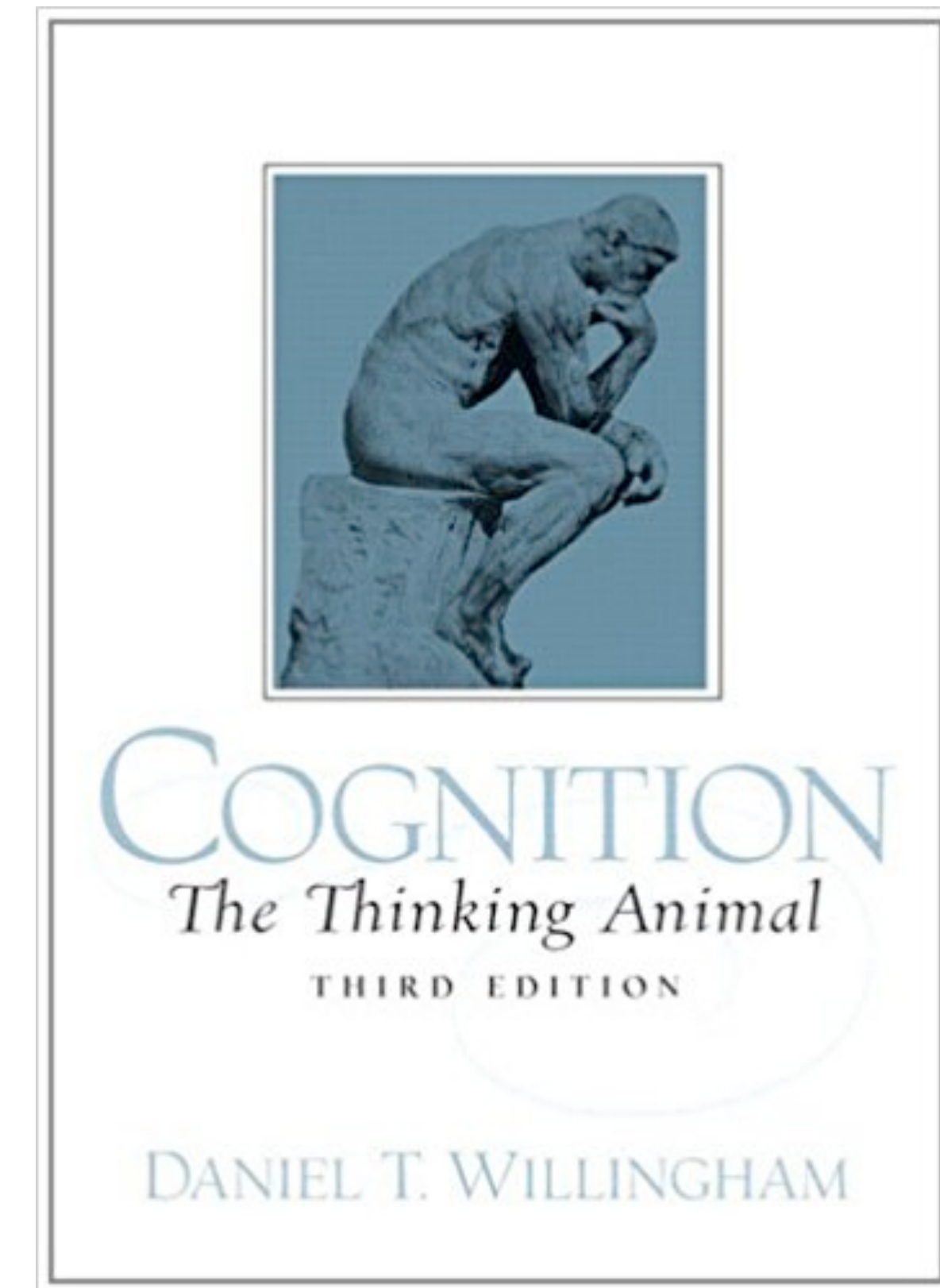
- Neural basis of Cognition

Kandel, Schwartz, Jessel, Siegelbaum and Hudspeth, 2012

Course Topics

Cognition:

- Cognitive psychology

- Cognitive domains

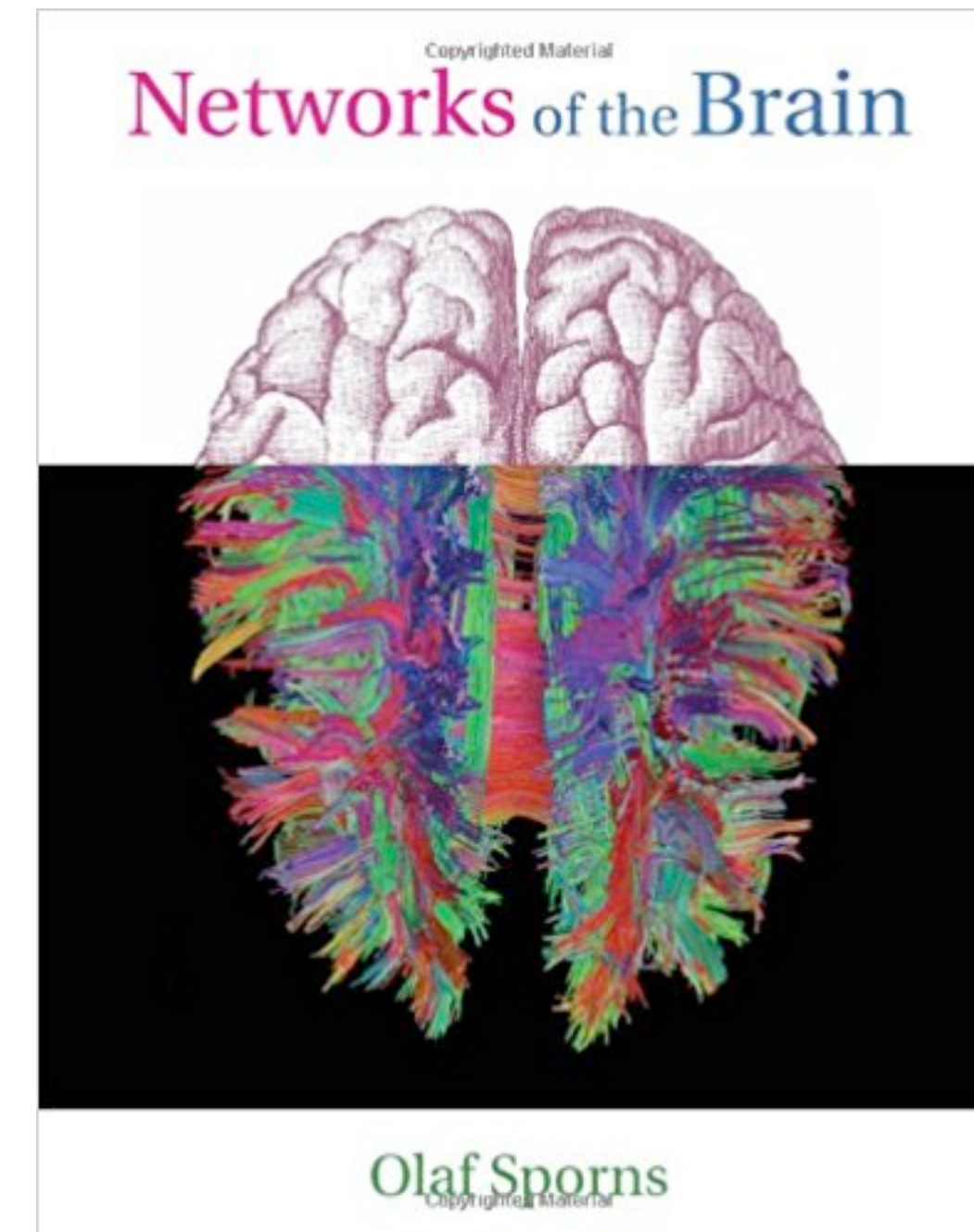- Methods in cognitive psychology

Willingham, 2006

Course Topics

Brain organization and networks:

- Brain networks organization and development

- Networks for cognition
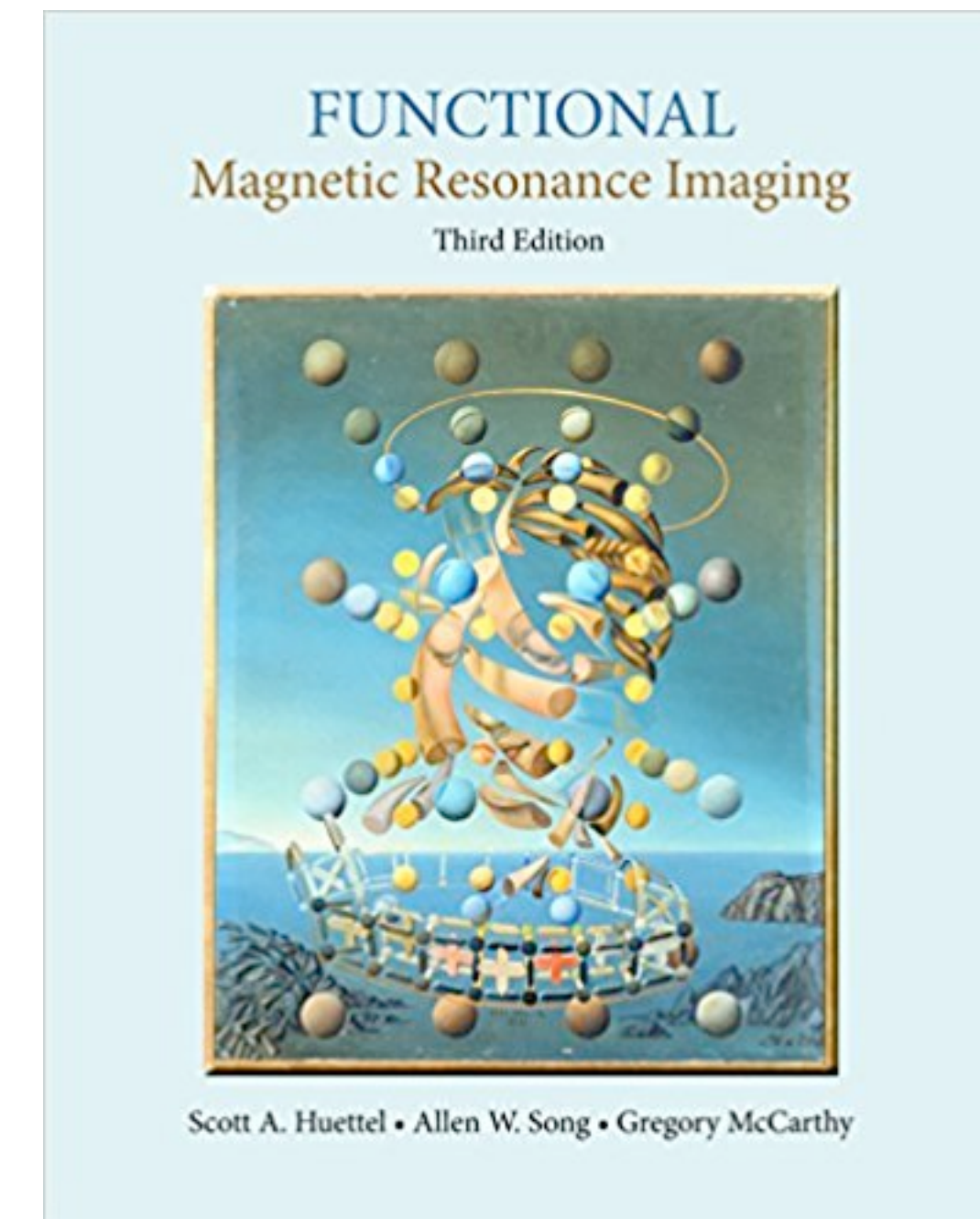
- Networks in disease

Sporns, 2016

Course Topics

Principles of Magnetic Resonance Imaging

- Basics of the MRI signal

- Understanding pulse sequences
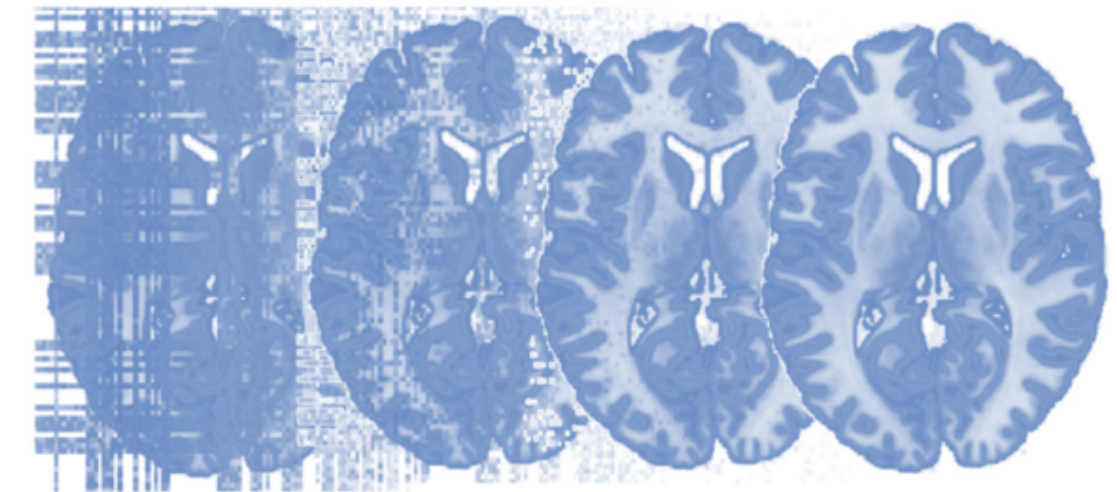
- Applications of MRI

Huettel, Song and McCarthy 2014

Course Topics

Principles of functional magnetic resonance imaging

- Acquiring fMRI data

- Processing fMRI data

- Application and analysis of fMRI data
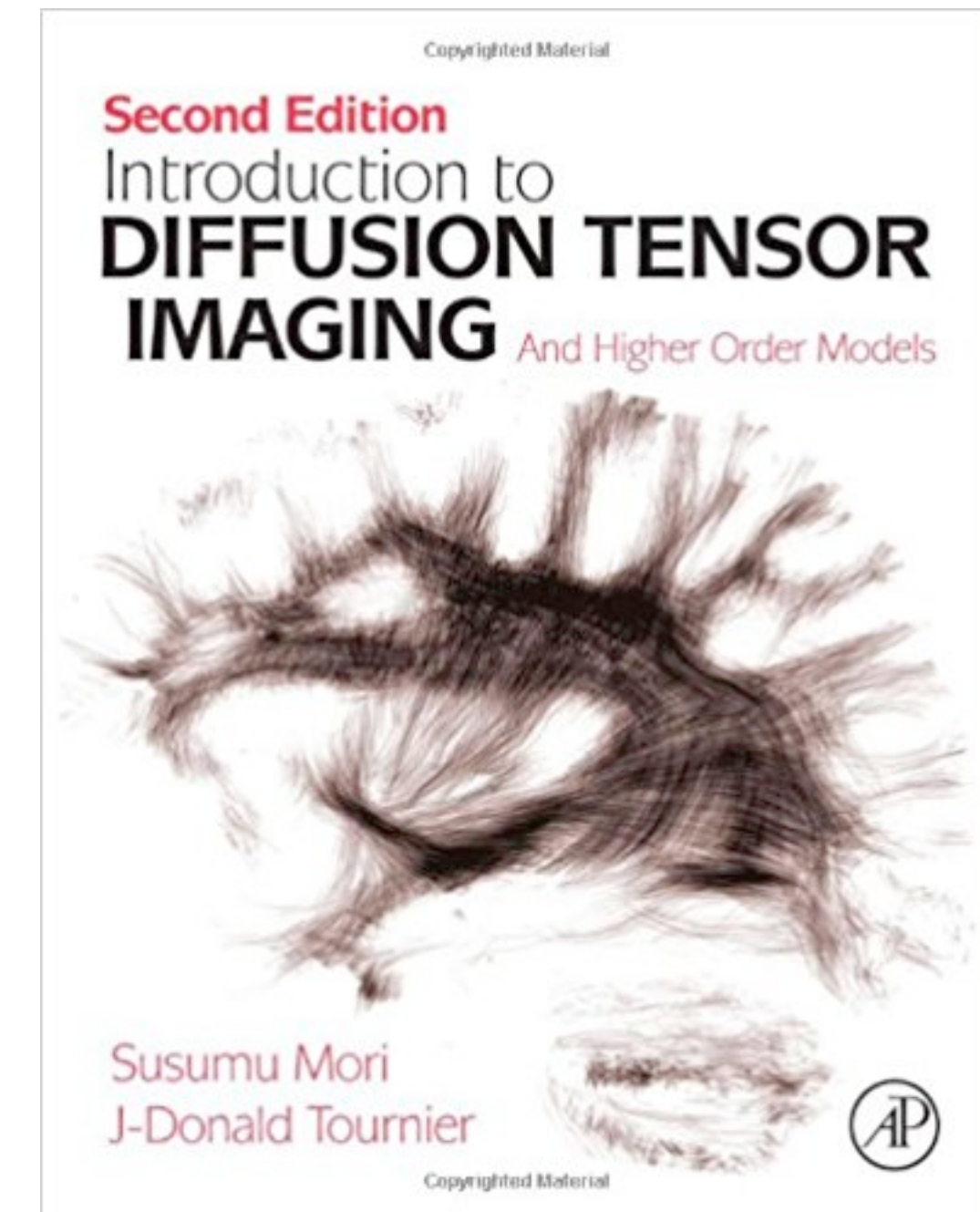
Principles of fMRI

Martin A. Lindquist, Ph.D.

Tor D. Wager, Ph.D.

Course Topics

Diffusion Tensor Imaging

- Basis of DTI imaging

- Analysis and modeling of data

- Applications of DTI imaging

Mori and Tournier, 2013

Thank you!