Translational research program that has focused on:
- Implementation of MR pulse sequences (novel/ WIP/ clinically available):
  - To characterize structure of MSK tissues both morphologically and through quantitative MR biomarkers
  - To address clinical imaging and management challenges
- Explore the potential for quantitative MR biomarkers to reflect tissue function (material property)

Overarching goal is to understand MSK disease processes to establish objective means for early diagnosis and to guide treatment
UCSD MSK Imaging Research Lab

- **TMJ**
  - NIH R0-1 Chung PI

- **Meniscal repair**
  - NIH R0-1 Chung PI

- **Articular cartilage**
  - VA Merit Chung PI
  - NIH R0-1 Du PI, Chung Co-PI
  - NIH R0-1 Du PI, Chung Co-I

- **Imaging around metal**
  - VA Merit Chung PI

- **Spine**
  - NIH R0-1 Bae PI, Chung Co-I

- **Tendon**
  - VA Merit Chang, Chung Co-I
Translational Imaging Articular Cartilage
Clinical Application

Clinical Challenge: Establish Reconstitution Of Calcified Layer Cartilage In Repair Tissue

Application to Clinical Problem
Focal chondral defect 3 years after injury. Note bone overgrowth of defect with overlying thin cartilage repair tissue on DESS. UTE T2* map shows elevated UTE T2* to intact appearing peri-lesional cartilage.
Translational Imaging Articular Cartilage

Material Property Quantitative MR (MP qMRI)

- high T1rho correlated with low indentation stiffness
- T1rho also correlated with biochemical content
Direction and Avenues for Collaboration

- Segmentation, Registration and Post-processing
  - Potential collaboration with NeuroCognetix
Direction and Avenues for Collaboration

Fast Imaging –
Collaboration with HeartVista to adapt cardiac package to kinematics in MSK
RF Coil Development

• Interest and need for coil development and RF lab

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