

Pediatric and Human Movement Research

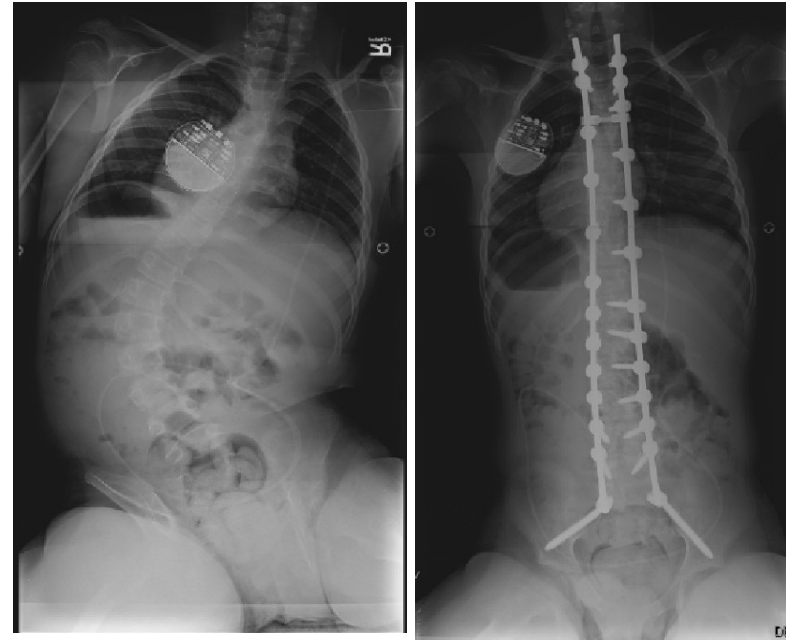
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Pediatrics

- Scoliosis surgery
- Harms Study Group
 - Multi-Center
 - Develop database > 3000 patients
 - 8 year prospective study to evaluate
 - A/P to P & staged vs not
 - Quality of life
 - Operative vs Non-operative outcomes
 - Risk of post operative infection
 - Evaluate natural history prior to surgical intervention
 - Effect of diagnoses on treatment
 - Scheuermann's Kyphosis
 - Cerebral Palsy Scoliosis
 - Marfan's Syndrome
 - Congenital Scoliosis

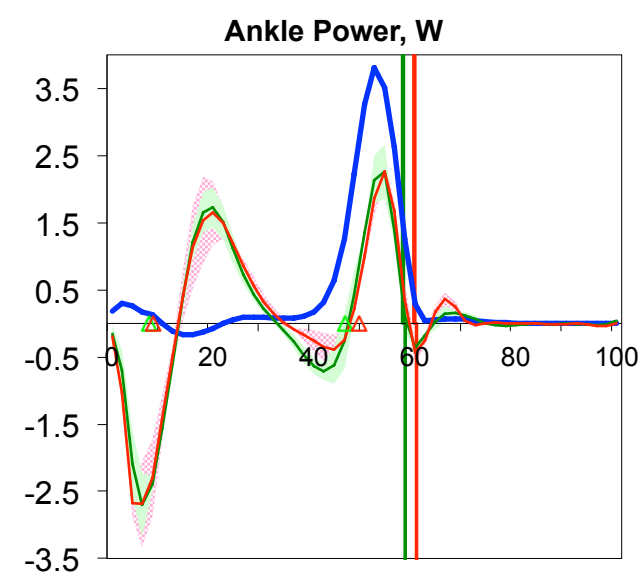
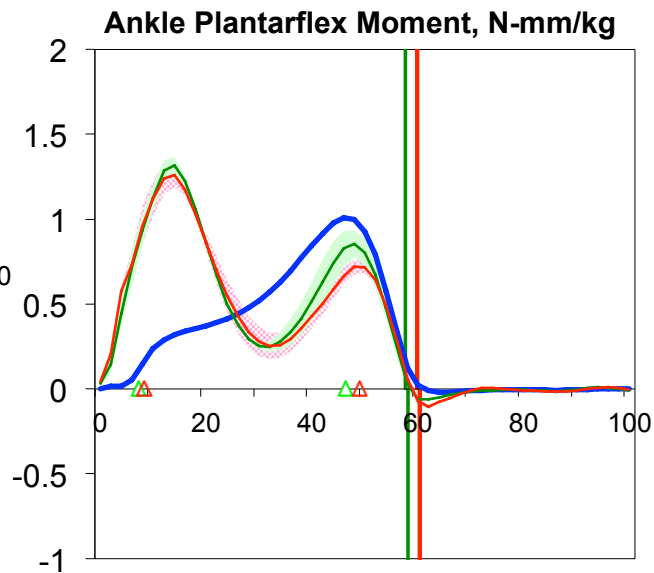
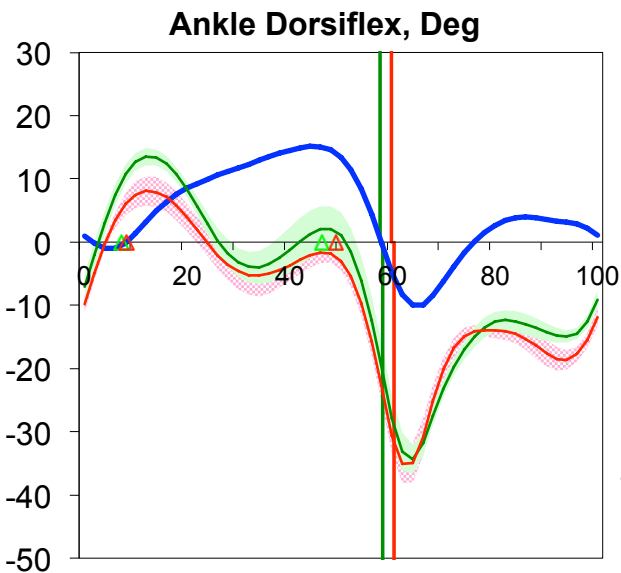


Pediatrics Goals

- Create Spinal Deformity Center at UVA
- Develop new in house database
 - Prospective study to evaluate:
 - Early onset scoliosis
 - Congenital scoliosis
 - Effects on lung function
 - Employ EOS imaging (low dose 3D x-ray)
 - Dynamics MRI

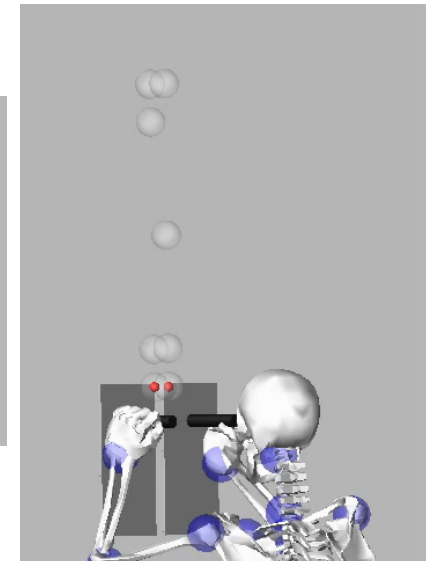
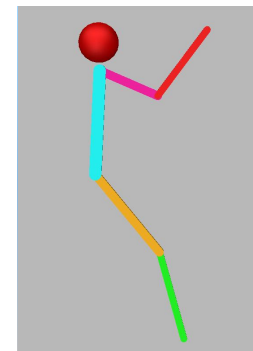
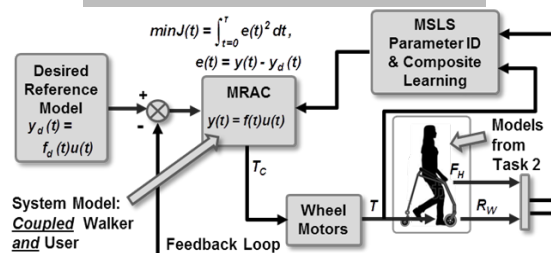
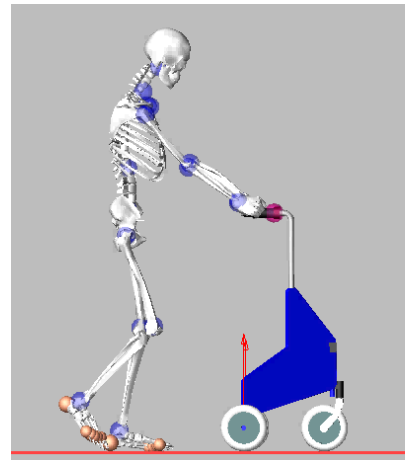
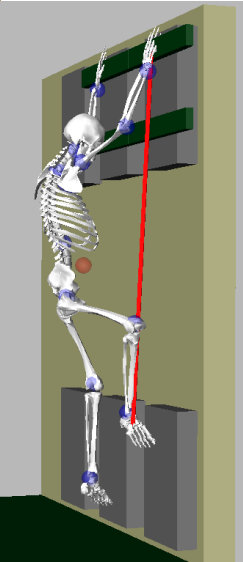
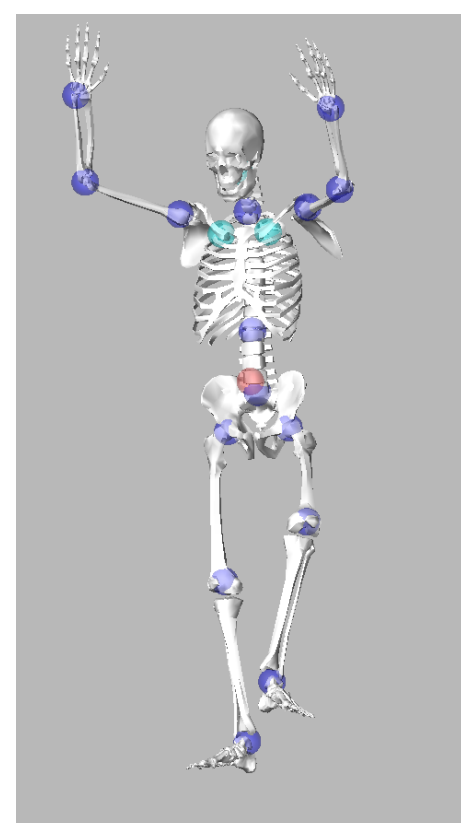
Movement Analysis

- How do interventions effect human movement
 - Clinical
 - Pre post surgery
 - Efficacy of interventions



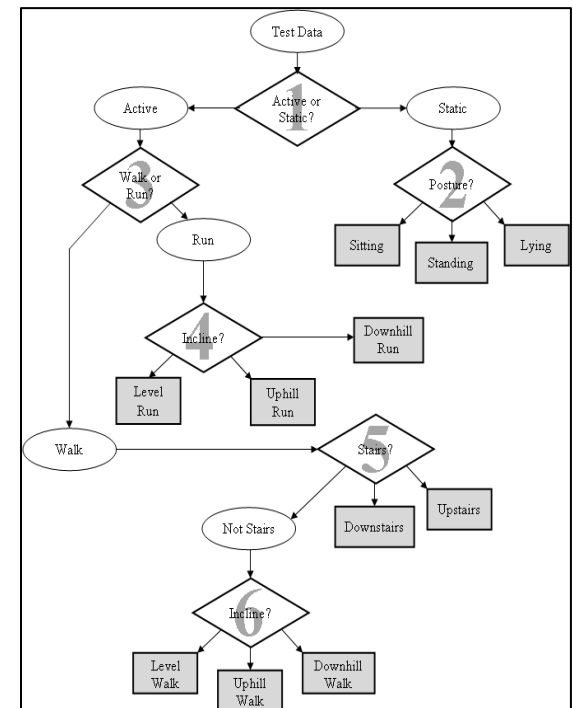
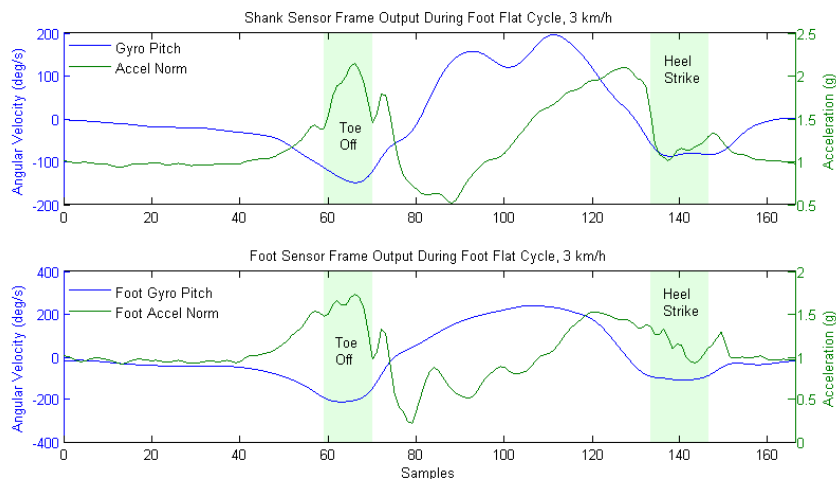
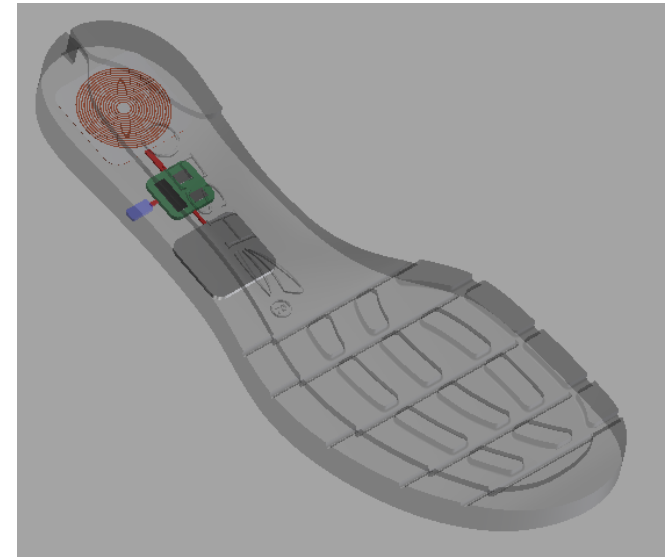
Movement Analysis

- How do interventions effect human movement
 - Basic Science
 - Why do we move the way we do
 - What is better?
 - Use models to answer questions



Take Research Out of Lab Setting

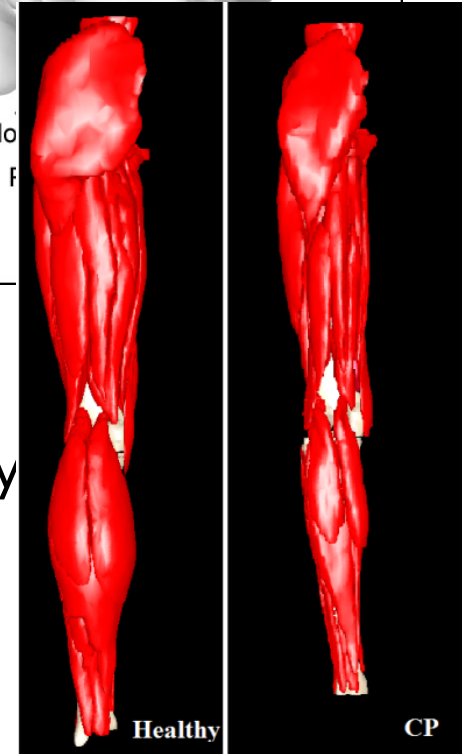
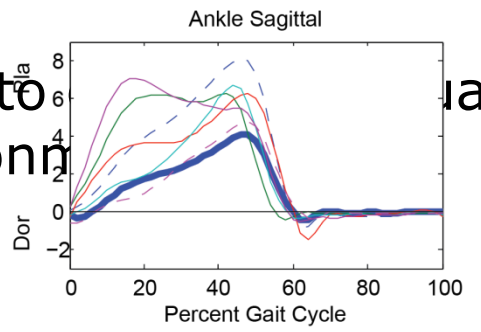
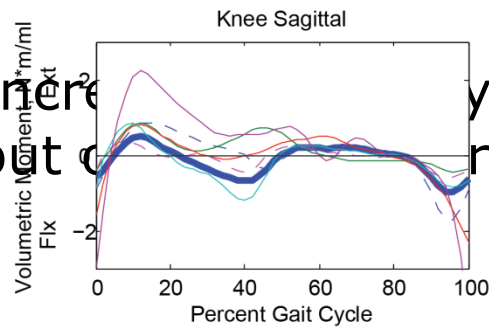
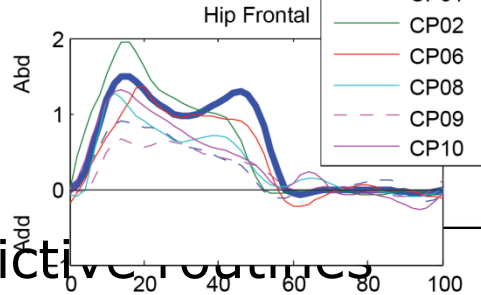
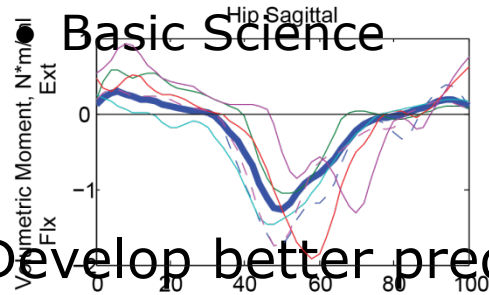
- Inertial Measurement Units, IMU
- Collect motion data out of lab
- Developed hyper precise calibration techniques
- Stride length within 2-3%
- Activity recognition
Walking, running, stairs, incline



Where Next?

- How do interventions effect human movement

- Improve fidelity of models
 - Clinically



- Develop better predictive routines
- Increase accuracy to quality

Thank You

