

## **Mohamed Mahfouz, PhD**

### **CURRICULUM VITAE**

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#### **EDUCATION**

- **Ph.D. , 2002, Colorado School of Mines, CO**
- **Masters of Science in Electrical Engineering, 1997, University of Denver, CO**
- **Masters of Science in Systems and Biomedical Engineering, 1992, Cairo University, Egypt**
- **Bachelors of Science in Systems and Biomedical Engineering, 1987, Cairo University, Egypt**

#### **Dissertation**

**A New Registration Method for Implanted and Non Implanted Knee Joints Using Single Plane X-Ray Video Fluoroscopy.**

#### **Thesis**

**Computerized Radiotherapy Planning of Cancer of Cervix Uteri.**

#### **RESEARCH INTERESTS**

- **biomedical instrumentation**
- **medical imaging and enhancement**
- **surgical navigation**
- **advanced visualization**
- **orthopedic dynamic modeling**
- **3D bone and tissue reconstruction**
- **vascular computational fluid dynamics**
- **engineering analysis of surgical techniques and outcomes**
- **anthropomorphic classification**

#### **PROFESSIONAL EXPERIENCE**

**2002-present     Associate Professor of Biomedical Engineering  
University of Tennessee, Knoxville, TN**

**2002-present      Technical Director, Center for Musculoskeletal Research,  
Computational Sciences and Engineering Division  
Oak Ridge National Laboratory, Oak Ridge, TN**

**1998-2002 Technical Director  
Rocky Mountain Musculoskeletal Research Laboratory,  
Denver, CO**

**1997 – 1998      Project Engineering Manager, Technical Leader, Project  
Leader  
Raytheon – Automated Systems Division, Englewood, CO**

**1995 – 1997      I/T Architect, Advisory I/T Specialist  
IBM – International Business Machines Corp., Denver, CO**

**1991-1994 Senior Software Engineer,  
AL EMARA Consulting Services-Medical Information Systems  
Division  
Cairo, Egypt**

**1989 - 1990      Research Engineer  
National Research Center of Egypt, Cairo, Egypt**

**1987 – 1989      Engineering Consultant, Biomedical Consulting Group,  
Cairo, Egypt**

#### **RECENT AWARDS**

- **Biomedical Engineering Society Outstanding Paper Award, 12<sup>th</sup>  
International Conference on Biomedical Engineering, Singapore, 2005**
- **Best Scientific Exhibit, American Academy of Orthopaedic Surgeons,  
Conference 2005**
- **Coventry Award**

#### **PROFESSIONAL ACTIVITIES**

- **Institute of Electrical and Electronics Engineers (IEEE) senior member  
— IEEE Engineering in Medicine and Biology Society  
— IEEE Computer Society**
- **Orthopaedic Research Society (ORS)**
- **American Association for the Advancement of Science (AAAS)**
- **International Society of Technology in Arthroplasty (ISTA)**

## **TEACHING**

- **Bioinstrumentation**
- **Biomedical Imaging**
- **Multi-Dimensional Medical Image Analysis**
- **Microelectromechanical Systems**
- **Biomedical Senior Design**

## **GRANTS AWARDED**

**2006 Total Grants Awarded (to date): \$2,558,156**

### **Zimmer, Inc**

**NURBS Bone Atlas, Phase II Femoral and Tibial Bones \$153,675**

**RF Smart Implant System \$692,490**

**Bone Morphing, Bi-Planar, & Mechanical Axes Systems \$263,699**

**Intraoperative Technique & Devices using RF Tracking & Ultrasound  
\$691,791**

**MEMS Spacer, Provisional & Force Actuator Systems for Ligament  
Balancing \$642,204**

### **Zimmer Hip**

**In Vivo Analysis of THA Kinematics with Zimmer MIS approach  
\$114,297**

**2005 Total Grants Awarded: \$935,330**

**DePuy Orthopaedics Inc., a Johnson and Johnson Company \$306,438**

**Determination Of Bone Geometry And Kinematics For Non-Implanted  
Subjects**

**DePuy Orthopaedics Inc., a Johnson and Johnson Company \$159,370**

**In Vivo Assessment of Hip Kinematics During Four Difficult Activities**

**Oak Ridge National Laboratory \$25,000**

**Modeling Of Electrophysiology of The Cardiac Muscle Heart**

**Oak Ridge National Laboratory \$25,000**

**Multiscale Model for Vascular Fluid Dynamics**

**Oak Ridge National Laboratory \$25,000**

**Image Deconvolution for Confocal Microscopy**

**Zimmer, Inc. \$280,225**

**Development of A NURBS Bone Atlas: Phase I Femoral and Tibial Bones**

**Zimmer Hip \$114,297**

**In vivo of THA kinematics for Subjects with Zimmer MIS Approach**

**Archus Orthopaedics \$100,000 Donation**

**2004 Total Grants Awarded: \$328,037**

**Zimmer, Inc. \$253,000**

**Anatomical Database, Density Gradient, and Demographics  
Centerpulse Orthopedics Inc., a Zimmer Company \$75,037**

**2003 Total Grants Awarded: \$346,579.15**

**DePuy Orthopaedics Inc., a Johnson and Johnson Company \$81,300.74**  
**Deformable Bone Atlas**

**DePuy Orthopaedics Inc., a Johnson and Johnson Company \$106,240.74**  
**Pose and Shape Determination of Deformable Knee Models from Biplanar  
X-Ray Fluoroscopy Images**

**Centerpulse Orthopedics Inc., a Zimmer Company \$75,037.67**  
**In Vivo 3D Kinematic Analysis of the DYNESYS Implant ( )**

**DJ Orthopedics \$84,000**

**In Vivo Determination of 3D Kinematics for an ACL Deficient Knees with &  
without a Brace**

**2002 Total Grants Awarded: \$334,000**

**Colorado Alliance for Bioengineering (CAB) & Colorado Commission on  
Higher Education (CCHE) \$59,000**

**Tomographic Imaging from Fluoroscopic Video**

**DePuy Orthopaedics, a Johnson and Johnson Company \$78,000**

**Interactive Segmentation Tools of Bones Using Magnetic Resonance  
Imaging**

**Archus Orthopedics Inc. \$76,000**

**In Vivo 3D Kinematic Analysis of the Lumbar Spine**

**Zimmer, Inc.**

**Development of a Mathematical Model to Determine In Vivo Shoulder  
and Elbow Forces/Torques for Subjects \$129,000**

- 1. Rotator cuff tear without an implant.**
- 2. Rotator cuff tear with a “reverse articulation” prosthesis.**
- 3. Normal shoulder without an implant.**
- 4. Implanted shoulder with a Zimmer primary shoulder  
prosthesis.**

**2001 Total Grants Awarded: \$120,000**

**NSF Intelligent Biomedical Devices and Musculoskeletal Systems IBDMS  
\$60,000**

**Accuracy Analysis of a 3D-to-2D Registration System.  
NSF Intelligent Biomedical Devices and Musculoskeletal Systems IBDMS  
\$60,000**

**Muscle Simulation for Musculoskeletal Analysis.  
BOOK CHAPTERS**

**The Adult Knee. Callaghan, Rubash, Simonian, and Wickiewicz, "Kinematics of the Knee (stable, unstable, and arthroplasty)", Komistek, Dennis, and Mahfouz, Lippincott, Williams and Wilkins, Philadelphia, 2001.**

**Biomechanics. Komistek, Mahfouz, Dennis: " Orthopaedic Knowledge Update: Hip and Knee Reconstruction, 2003.**

**The Adult Hip. Callaghan, Rosenberg, and Rubash, "Kinematics of the Hip," Komistek, Dennis, Mahfouz, 2004.**

**Orthopaedic Knowledge Update: Hip and Knee Reconstruction 3. Barrack, Booth, Lonner, McCarthy, Mont, Rubash (Eds.), "Biomechanics of the Knee," Komistek, Mahfouz, Dennis, Chapter 2, pp 17-29, 2005.**

**Surgery of the Knee, Norman Scott (Ed.), "Fluoroscopic Analysis of Total Knee Replacement," Komistek, Dennis , Mahfouz, Volume Two, Chapter 89, pp 1592-1612, 2006.**

## **BOOK CHAPTERS**

**The Adult Knee, Callaghan, Rubash, Simonian, and Wickiewicz, "Kinematics of the Knee (stable, unstable, and arthroplasty)", Komistek, Dennis, and Mahfouz, Lippincott, Williams and Wilkins, Philadelphia, 2001.**

**Biomechanics, Komistek, Mahfouz, Dennis: " Orthopaedic Knowledge Update: Hip and Knee Reconstruction, 2003.**

**The Adult Hip, Callaghan, Rosenberg, and Rubash, "Kinematics of the Hip," Komistek, Dennis, Mahfouz, 2004.**

**Orthopaedic Knowledge Update: Hip and Knee Reconstruction 3, Barrack, Booth, Lonner, McCarthy, Mont, Rubash (Eds.), "Biomechanics of the Knee," Komistek, Mahfouz, Dennis, Chapter 2, pp 17-29, 2005.**

**Surgery of the Knee, Norman Scott (Ed.), "Fluoroscopic Analysis of Total Knee Replacement," Komistek, Dennis , Mahfouz, Volume Two, Chapter 89, pp 1592-1612, 2006.**

## **PUBLICATIONS**

**Dennis, Komistek, Scuderi, Argenson, Insall, and Mahfouz: 'In Vivo Three-Dimensional Determination of Kinematics for Subjects with a Normal Knee or a Unicompartamental or Total Knee Replacement' J Bone Joint Surgery 83:S104-S115, 2001.**

**Komistek, Dennis, Mahfouz: 'In Vivo Fluoroscopic Analysis of the Normal Human Knee.' Clinical Orthopedics 410: 69-81, 2003.**

**Dennis, Komistek, Mahfouz: 'In Vivo Fluoroscopic Analysis of Fixed-Bearing Total Knee Replacements.' Clinical Orthopedics, 410:114-130, 2003.**

**Mahfouz, Traina, Komistek, Dennis, Oster: An In Vivo Determination of Knee Kinematics for Subjects Having either a Hamstring or Patellar Tendon ACL Graft. The Journal of Knee Surgery, Vol. 16, No. 4, October 2003**

**Mahfouz, Hoff, Komistek, Dennis: A Robust Method for Registration of Three-Dimensional Knee Implant Models to Two-Dimensional Fluoroscopy Images, IEEE Transactions on Medical Imaging, Vol. 22, No. 12, December 2003.**

**Komistek, Kane, Mahfouz, Ochoa, Dennis: “Knee Mechanics: A Review of Past and Present Techniques to Determine In Vivo Loads.” J Biomechanics, April 2004.**

**Dennis, Komistek, Mahfouz, Haas, and Stiehl: In Vivo Determination Of Knee Kinematics: A Multicenter Analysis Of 811 Total Knee Arthroplasty. Clin Orthop. November 2004.**

**Dennis, Komistek, Mahfouz: “In Vivo Determination of Axial Rotation: A Multicenter Analysis of 1007 Knees,” CORR (accepted).**

**Argenson, Komistek, Mahfouz, Walker, Aubaniac, Dennis: “A High Flexion Total Knee Arthroplasty Design Replicates Healthy Knee Motion.” Clin. Orthop 428: 174-179, November 2004.**

**Dennis, Komistek, Mahfouz, Walker, Tucker: “A Multicenter Analysis of Axial Femorotibial Rotation after Total Knee Arthroplasty.” Clin Orthop 428: 180-189, November 2004.**

**Komistek, Dennis, Mahfouz, Hoff, Haas, Anderson: “In Vivo Determination of Three Dimensional Normal Knee Motion During Five Weight-bearing Activities.” Journal of Bone and Joint Surgery, Supplement IV, 2004.**

**Komistek, Dennis, Mahfouz, Walker: “In Vivo Determination of Polyethylene Bearing Motion in Subjects with a Posterior Stabilized Mobile Bearing TKA.” CORR, November 2004.**

**Argensen, Komistek, Mahfouz, Dennis: “In Vivo Femorotibial and Patellofemoral Kinematics for Subjects into Deep Flexion,” CORR 2004,.**

**Bertin, Komistek, and Mahfouz: “In Vivo Determination of Knee Kinematics for Subjects Having a PCR TKA without a PCL.” J Arthroplasty (submitted).**

**Haas, Komistek, Mahfouz, Kilgus: “In Vivo Determination of Polyethylene Bearing Motion in Subjects with a Posterior Cruciate Sacrificing Mobile Bearing TKA.” J Arthroplasty (submitted).**

**Baker, Mahfouz, Debrunner, Hoff, and Bowen: “Computed Tomography From Fluoroscopy Images Generated Along Arbitrary Path” (Submitted to the Journal of IEEE on Medical Imaging).**

**Mahfouz, Komistek, Sedel, Dennis, and Bizot: “In Vivo Assessment of THA Kinematics During Normal Gait for Subjects Having Variable Bearing Surfaces.” (Submitted to the Journal of Arthroplasty, presently in the process of revision. Manuscript # 03.193).**

**Mahfouz, Komistek, and Wong: “In Vivo 3D Kinematics of the Lumbar Spine of Normal and Degenerative Subjects.” (Submitted to the International Journal of Spine).**

**Mahfouz, Hoff, Komistek, Dennis: “Effect of Segmentation Errors on 3D-to-2D Registration of Implant Models in X-ray Images.” J Biomechanics, February 2005.**

**Dennis, Mahfouz, Komistek, Hoff: “In Vivo Determination of Normal and Anterior Cruciate Ligament-deficient Knee Kinematics.” Journal of Biomechanics. 38: 241-253, February 2005.**

**Komistek, Kane, Mahfouz, Ochoa, Dennis: “Knee Mechanics: A Review of Past and Present Techniques to Determine in Vivo Loads.” Journal of Biomechanics. 38:215-228, February 2005.**

**Sugita, Sato, Mahfouz, Komistek, Maeda, and Sano: “In Vivo Determination of Knee Kinematics for Japanese Subjects Having Either a LCS Rotating Platform or AP Glide TKA.” J. Arthroplasty, February 2005.**

**Lee, Matsui, Muratsu, Kuroda, Komistek, Mahfouz, Dennis, Kurosaka, and Yoshiya: “Condylar Lift-Off in Posterior Cruciate-Retaining and Posterior Stabilized Total Knee Arthroplasties.” June 2005.**

**Yoshiya, Matsuyi, Komistek, Dennis, Mahfouz, Kurosaka: “In Vivo Kinematic Comparison of Posterior Cruciate-Retaining and Posterior Stabilized Total Knee Arthroplasties under Passive and Weight-Bearing Conditions” Submitted to the Journal of Arthroplasty, September 2005.**

**Lee, Matsui, Kurosaka, Komistek, Mahfouz, Dennis, Yoshiya: “A Posterior-Stabilized Total Knee Arthroplasty Shows Condylar Lift-off during Deep Knee Bends.” CORR 435: 181-184, 2005.**

**Dennis, Mahfouz, Komistek, Hoff: “In Vivo Determination of Normal and Anterior Cruciate Ligament-deficient Knee Kinematics.” Journal of Biomechanics. 38: 241-253, February 2005.**



**Komistek, Kane, Mahfouz, Ochoa, Dennis: "Knee Mechanics: A Review of Past and Present Techniques to Determine in Vivo Loads." Journal of Biomechanics. 38:215-228, February 2005.**

**Nadaud, Komistek, Mahfouz, Dennis, Anderle: "In vivo Three-dimensional Determination of the Effectiveness of the Osteoarthritic Knee Brace: A Multiple Brace Analysis." J Bone Joint Surgery AM 87, Suppl. 2, 2005.**

**Mahfouz, Nicholson, Komistek, Hovis, Kubo: "In vivo Determination of the Dynamics of Normal, Rotator Cuff Deficient, Total, and Reverse Replacement Shoulders." J Bone Joint Surgery AM 87, Suppl. 2, 2005.**

**Dennis, Komistek, Mahfouz, Outten, Sharma: "Mobile-Bearing Total Knee Arthroplasty: Do the Polyethylene Bearings Rotate?" CORR 44: 88-95, 2005.**

#### **CONFERENCE PRESENTATIONS**

**Komistek, Hoff, Mahfouz, Sarojak, Dennis, Anderson: An Interactive Fluoroscopy-Based System For In Vivo Kinematic Analysis of Total Joint Arthroplasty, European Society of Biomechanics, Dublin, Ireland, August, 2000.**

**Komistek, Dennis, Mahfouz, Haas: In Vivo Determination Of Three Dimensional Normal Knee Motion During Five Weight-Bearing Activities, 4<sup>th</sup> Combined Meeting of the Orthopaedic Research Societies of Biomechanics, Rhodes, Greece June, 2001.**

**Mahfouz, Hoff, Komistek, Dennis: Post-Operative Analysis of Knee Joint Kinematics using Fluoroscopy, with Error Analysis, 5<sup>th</sup> Annual North American Program on Computer Assisted Orthopaedic Surgery CAOS, Pittsburgh, Pennsylvania, July, 2001.**

**Komistek, Dennis, Mahfouz, Hoff, Haas, Anderson: In Vivo Determination Of Three Dimensional Normal Knee Motion During Five Weight-Bearing Activities, 18<sup>th</sup> Congress of International Society of Biomechanics, Zurich, Switzerland, July, 2001.**

**Komistek, Dennis, Mahfouz, Hoff, Haas, Anderson: In Vivo Determination of Three Dimensional Normal Knee Motion During Five Weight-Bearing Activities, ISTA, September, 2001.**

**Mahfouz, Hoff, Anderson, Northcut, Komistek: "Verification of Three-Dimensional Joint Kinematics Determined Using Fluoroscopy: An Error Analysis" 48th Annual Meeting Orthopaedic Research Society, Dallas, TX, February, 2002.**

**Komistek, Kane, Mahfouz, Dennis, Haas: In Vivo Forces and Motions from Fluoroscopy and Mathematical Modeling, 4th World Congress of Biomechanics, Calgary, Canada, August, 2002.**

**Mahfouz, Hoff, Underwood, Komistek, Dennis: Global Optimization For Recovering The Position And Orientation Of Free-Form Objects In Medical Imaging Registration Using A New Smoothing Approach, 4th World Congress of Biomechanics, Calgary, Canada, August, 2002.**

**Mahfouz, Komistek, Walker, Dennis: Muscle Reconstruction and Modeling from Magnetic Resonance Imaging, 4th World Congress of Biomechanics, Calgary, Canada, August, 2002.**

**Mahfouz, Hoff, Komistek, Dennis: Verification Of Three-Dimensional Joint Kinematics Determined Using Fluoroscopy: An Error Analysis, 4th World Congress of Biomechanics, Calgary, Canada, August, 2002.**

**Komistek, Dennis, Mahfouz, Hoff, Haas, Anderson: In Vivo Determination Of Three Dimensional Normal Knee Motion During Five Weight-Bearing Activities, SICOT, San Diego, California, USA, August, 2002.**

**Northcut, Kobori, Komistek, Haas, Walker, Macht, Mahfouz: Comparison of Fixed vs. Mobile Bearing Range of Motion For Japanese Patients having Either a Resurfaced or Unsurfaced Patella, SICOT, San Diego, California, USA, August, 2002.**

**Kilgus, Komistek, Haas, Smith, Hammill, Dennis, Walker, Mahfouz: Polyethylene Bearing Motion Relative to the Tibia and the Femur in Mobile Bearing TKA, SICOT, San Diego, California, USA, August, 2002.**

**Lombardi, Komistek, Northcut, Dennis, Anderle, Mahfouz: In Vivo Determination of CAM/POST Engagement and Kinematics of the Femur Relative to The Polyethylene Insert, SICOT, San Diego, California, USA, August, 2002.**

**Argenson, Komistek, Mahfouz, Aubaniac, Dennis: In Vivo Determination of Knee Kinematics for Subjects Implanted with Unicompartmental Arthroplasty, SICOT, San Diego, California, USA, August, 2002.**

**Mahfouz, Dennis, Komistek, Sedel, Bizot, Nortcut, Hammill, Anderle: In Vivo Determination of Hip Separation in Subjects having Either Alumina-on-Alumina or Alumina-on-Polyethylene Total Hip Arthroplasty, SICOT, San Diego, California, USA, August, 2002.**

**Komistek, Kane, Mahfouz, Dennis, Haas: In Vivo Forces and Motions from Fluoroscopy and Mathematical Modeling, ISTA, London, England, September, 2002.**

**Mahfouz, Hoff, Underwood, Komistek, Dennis: Global Optimization For Recovering The Position And Orientation Of Free-Form Objects In Medical Imaging Registration Using A New Smoothing Approach, ISTA, London, England, September, 2002.**

**Mahfouz, Komistek, Walker, Dennis: Muscle Reconstruction and Modeling from Mri-Scan, ISTA, London, England, September, 2002.**

**Mahfouz, Hoff, Komistek, Dennis: Verification Of Three-Dimensional Joint Kinematics Determined Using Fluoroscopy: An Error Analysis, ISTA, London, England, September, 2002.**

**Mahfouz, Komistek, Dennis, Sonin, Otte, Walker: In Vivo Determination of Three Dimensional Normal Knee Motion During Five Weight-bearing Activities Using X-ray Fluoroscopy and MRI. RSNA 88th Annual Meeting, December 1-6, 2002.**

**Mahfouz, Komistek, Traina, Sonin, Otte, Walker: In Vivo Determination of 3D Kienmatics in an ACL Deficient Knee using X-ray Fluoroscopy and MRI. RSNA 88th Annual Meeting, December 1-6, 2002.**

**Mahfouz, Komistek, Dennis, Sonin, Otte, Walker: Muscle Reconstruction and Modeling of a Human Lower Extremity Using 3D Fat Suppressed Gradient Echo MR Imaging Data. RSNA 88th Annual Meeting, December 1-6, 2002.**

**Mahfouz, Smith, Komistek, Walker, Dennis: Muscle Simulation for Musculoskeletal Analysis, AAOS, February, 2003.**

**Bertin, Komistek, Mahfouz, Hajner, and Langer: In Vivo Kinematics for Subjects Having an Asymmetrical Posterior Cruciate Retaining TKA, AAOS, February, 2003.**

**Komistek, Kane, Mahfouz, Carollo, Langer, Dennis: In Vivo Determination of Joint and Muscle Forces in the Human Leg, AAOS, February, 2003.**

**Komistek, Dennis, Mahfouz, Argenson, Ranawat, Walker, Schiffrine, Bachelin, Haas, and Kilgus: In Vivo Kinematics for Subjects Having Various Types of Knee Replacements, AAOS, February, 2003.**

**Goffin, Komistek, Mahfouz, Wong, Macht, Hoff: In Vivo Kinematics of Normal, Degenerative, Fused and Disk-Replaced Cervical Spines, AAOS, February, 2003.**

**Mahfouz, Baker, Komistek, Dennis: A New Method To Measure In Vivo Hip Joint Separation Using Hough Transform, ORS, February, 2003.**

**Dennis, Komistek, Mahfouz, Haas, Traina: In Vivo Determination of Normal and ACL Deficient Knee Kinematics, ORS, February, 2003.**

**Goffin, Komistek, Mahfouz, Wong, Macht: In Vivo Kinematics of Normal, Degenerative, Fused and Disk-Replaced Cervical Spines, Poster, AAOS, February, 2003.**

**Langer, Komistek, Kane, Dennis, Mahfouz: A Three Dimensional Mathematical Model of the Ankle Joint Using Kane's Method of Dynamics, AAOS, February, 2003.**

**R. D. Komistek, PhD, D.A. Dennis, MD, M. Mahfouz, PhD, and B.D. Haas, MD: In Vivo Kinematics for Implanted and Non Implanted Knees, Oral Presentation, The International Society For Technology in Arthroplasty (ISTA) 16<sup>th</sup> Annual Meeting San Francisco, CA, USA September 24<sup>th</sup> -27<sup>th</sup> , 2003**

**Mahfouz, Komistek, Dennis and Hoff: In Vivo Determination of Normal and Anterior Cruciate Ligament Deficient Knee Kinematics, Oral Presentation, The International Society For Technology in Arthroplasty (ISTA) 16<sup>th</sup> Annual Meeting San Francisco, CA, USA September 24<sup>th</sup> -27<sup>th</sup> , 2003**

**Mahfouz, Dennis and Komistek: In Vivo Determination of Axial Rotation: A Multicenter Analysis of 811 Total Knees Arthroplasty, Oral Presentation, The International Society For Technology in Arthroplasty (ISTA) 16<sup>th</sup> Annual Meeting San Francisco, CA, USA September 24<sup>th</sup> -27<sup>th</sup> , 2003**

**Jean-Noel Argenson, MD, Richard. D. Komistek, PhD, Mohamed R Mahfouz, PhD, Douglas A Dennis, MD, and Jean-Noel Aubaniac, MD: In Vivo Femorotibial And Patellofemoral Kinematics for Subjects Into Deep Flexion, Oral Presentation, The International Society For Technology in Arthroplasty (ISTA) 16<sup>th</sup> Annual Meeting San Francisco, CA, USA September 24<sup>th</sup> -27<sup>th</sup> , 2003**

**Mohamed R Mahfouz, PhD, Richard D Komistek, PhD, and Gregory Nicholson: Development of Mathematical Model to Determine in Vivo Shoulder and Elbow Forces/Torques, Oral Presentation, The International Society For Technology in Arthroplasty (ISTA) 16<sup>th</sup> Annual Meeting San Francisco, CA, USA September 24<sup>th</sup> -27<sup>th</sup> , 2003**

**Richard. D. Komistek, PhD, Douglas A. Dennis, MD, Mohamed R Mahfouz, PhD, and Scott Walker, Ms: In Vivo Determination of PE Bearing in Subjects With A PS Mobile Bearing TKA, Oral Presentation, The International Society For Technology in Arthroplasty (ISTA) 16<sup>th</sup> Annual Meeting San Francisco, CA, USA September 24<sup>th</sup> -27<sup>th</sup> , 2003**

**Wong, Goffin, Leuven, Komistek, Mahfouz:’ In Vivo Kinematics of Normal, Degenerative, Fused and Disk-replaced Cervical Spines’, SECOND INTERDISCIPLINARY CONGRESS ON SPINE CARE World Spine II Chicago, Illinois, USA August 10<sup>th</sup> -13<sup>th</sup> , 2003**

**Wong, Jones, Komistek, and Mahfouz:’ Adaptation of a 3D Model-fitting Technique to Assess In Vivo Lumbar Spine Motion’, SECOND INTERDISCIPLINARY CONGRESS ON SPINE CARE World Spine II Chicago, Illinois, USA August 10<sup>th</sup> -13<sup>th</sup> , 2003**

**Kuhn M., Merkl B., Mahfouz M., Komistek R., “ 3D-to-2D Registration of Implant Models to X-ray Images with Special Emphasis on Error Analysis, Segmentation Effects, and Polyethylene Wear,” 18th Annual Symposium of the International Society for Technology in Arthroplasty, Kyoto, Japan, 2005.**

**Kuhn M., Mahfouz M., ElHak E., Merkl B., “Reconstruction of 3D Patient-Specific Bone Models from Biplanar X-ray Images,” 12th International Conference on Biomedical Engineering, Singapore, 2005.**

**Merkl B., Stiehl J., Mahfouz M., Kuhn M., “Implanted Hip Separation Calculated Using a Modified Hough Transform: Analysis of Radiographic Images,” 12th International Conference on Biomedical Engineering, Singapore, 2005.**

**Merkl B., Mahfouz M., “Unsupervised Three-Dimensional Segmentation of Medical Images Using an Anatomical Bone Atlas,” 12th International Conference on Biomedical Engineering, Singapore, 2005.**

**G. To, M. Mahfouz, and E. Pritchard. “Ligament Balancing during Total Knee Arthroplasty with Wireless Encapsulated Microcantilever Strain Sensors.” in Intl. Conf. on Biomed. Engr. Proceedings, Singapore, 2005.**

**B. Evans, M. Mahfouz, E. Pritchard, and G. To. “Development of Embedded MEMS Strain Sensor Arrays for Biomedical Applications.” in Intl. Conf. on Biomed. Engr. Proceedings, Singapore, 2005.**

**M.J. Kuhn, M.R. Mahfouz, E. Ali Abd ElFatah, B.C. Merkl, E. Pritchard. “3D Bone Reconstruction from Biplanar X-Rays.” in Intl. Conf. on Biomed. Engr. Proceedings, Singapore, 2005.**

**Zhang C., Kuhn M., Merkl B., Fathy A., Mahfouz M., “Accurate UWB Indoor Localization System Utilizing Time Difference of Arrival Approach,” IEEE Radio and Wireless Symposium, San Diego, USA, 2006.**

**Mahfouz M., Stiehl J., Merkl B., Kuhn M., Komistek R., “Implanted Hip Separation Calculated Using a Modified Hough Transform Analysis of Fluoroscopic Images,” Annual Meeting of American Academy of Orthopaedic Surgeons, Chicago, USA, 2006**

**Zhang C., Kuhn M., Merkl B., Fathy A., Mahfouz M., “High Resolution UWB Indoor Localization System Operating at 8 and 24 GHz Utilizing Time Difference of Arrival Approach,” URSI National Radio Science Meeting, Boulder, USA, 2006.**

**Moore M., Sylvester A., Merkl B., Kuhn M., Mahfouz M., “Creating a Statistical Atlas of Femora from Three-Dimensional CT Data,” Annual Meeting of American Association of Physical Anthropologists, Anchorage, USA, 2006.**

**Mohamed R. Mahfouz, Robert E. Booth, Jr, Jean Noel Argenson, Brandon C. Merkl, Emam E. Abdel Fatah, Michael J. Kuhn. "Analysis of Variation of Adult Femora Using Sex-Specific Statistical Atlases," 7th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Antibes, Cote d'Azur, France, 2006.**

**Michael J. Kuhn, Brandon C. Merkl, Mohamed R. Mahfouz. "Advanced 3D Analysis of Implanted Joints through 3D-to-2D Registration of Implant Models to Fluoroscopic Images," 7th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Antibes, Cote d'Azur, France, 2006.**

**Mohamed R. Mahfouz, Robert E. Booth, Jr., Jean Noel Argenson, Brandon C. Merkl, Michael J. Kuhn, Emam E. Abdel Fatah, Emily R. Pritchard. "Utilization of Biplanar X-Ray Images in 3D Reconstruction of Patient-Specific Bones and Automatic Morphometric Measurements," 7th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Antibes, Cote d'Azur, France, 2006.**

**Brandon C. Merkl, Mohamed. R. Mahfouz. "Automatic Three-Dimensional Segmentation of Medical Images Using Sex-Specific Statistical Atlases," 7th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Antibes, Cote d'Azur, France, 2006.**

**Mohamed R. Mahfouz, Brandon C. Merkl. "Automatic Segmentation of 3D Medical Images Using Fourier Descriptor-Based Deformable Models," 7th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Antibes, Cote d'Azur, France, 2006.**

**Zhang C., Kuhn M., Merkl B., Fathy A., Mahfouz M., "Development of an UWB Indoor 3D Positioning Radar with Millimeter Accuracy," International Microwave Symposium, San Francisco, California, 2006.**

**Mohamed Mahfouz, Ahmed Badawi, Emam ElHak, Michael Kuhn, and Brandon Merkl, "Reconstruction of 3D Patient-Specific Bone Models From Biplanar Xray Images Utilizing Morphometric Measurements," The 2006 World Congress in Computer Science Computer Engineering, and Applied Computing, Las Vegas, Nevada, 2006.**

**Mohamed Mahfouz, Ahmed Badawi, Brandon Merkl, Emam E. Abdel Fatah, Emily Pritchard, Kat Kesler, Megan Moore, and Richard Jantz, "3D Statistical Shape Models of Patella for Gender Classification," The 28th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, New York, New York, USA, 2006.**

**Boyd M. Evans III, Mohamed R. Mahfouz, Emily R. Pritchard, "Biocompatible MEMS Electrode Array for Determination of Three-Dimensional Strain," The 28th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, New York, New York, USA, 2006.**

**Mohamed R. Mahfouz, Ahmed M. Badawi, Brandon C. Merkl, Emam E. Abdel Fatah, Emily R. Pritchard, Katherine Kesler, Megan Moore, Richard Jantz, Lee Jantz. "Patella Sex Determination by 3D Statistical Shape Models and Nonlinear Classifiers" Forensic Science International.**

#### **GUEST LECTURESHIPS**

**National Science Foundation Industry/University Cooperative Research Center for Intelligent Biomedical Devices and Musculoskeletal Systems IBDMS, "Improvement of Optimization Algorithms in the Model Fitting System", Colorado School of Mines, Golden Colorado, April 2000.**

**National Science Foundation Industry/University Cooperative Research Center for Intelligent Biomedical Devices and Musculoskeletal Systems IBDMS, "Determination of The Femorotibial Kinematics of The Normal Knee", Colorado School of Mines, Golden Colorado, October 2000.**

**National Science Foundation Industry/University Cooperative Research Center for Intelligent Biomedical Devices and Musculoskeletal Systems IBDMS, "Three Dimensional Model Development of Human Muscles and Bones Using MR/CT", Colorado School of Mines, Golden Colorado, October 2001.**

**Colorado School of Mines, "3D-to-2D Registration in Medical Imaging" Golden, Colorado, November, 2001.**

**DePuy Inc., "Verification of Three-Dimensional Joint Kinematics Determined 3D-to-2D Registration System: An Error Analysis", Warsaw, IN, June 2001.**



**Medtronic Surgical Navigation Technologies, “MRI in Surgical Navigation”, Louisville, CO, January 2002.**

**University of Denver, “A New Optimization Techniques for Estimating 6 Degrees of Freedom for Implanted and Non Implanted Knees from Single Plane X- Ray Fluoroscopy”, Denver Colorado, May 2002.**

**DePuy Inc., “In Vivo Determination of Hip Joint Separation Using Hough Transform”, Warsaw, IN, June 2002.**

**John N. Insall Traveling Fellowship Rose Medical Center and Rocky Mountain Musculoskeletal Research laboratory, “Surgical Navigation Current and Future Practices”, Denver Colorado, October 2002**

**Archus Orthopedics Inc. Scientific Advisory Board Meeting, “In Vivo 3D Kinematic Analysis of the Lumbar Spine”, NASS 2003 San Diego, California, October 2003**