

# PROF. ARNEL L. AGUINALDO

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## SUMMARY

Biomechanics professor and engineer with over 14 years of teaching, research, and clinical experience in the fields of gait analysis, kinesiology, athletic training, and bioengineering

## EDUCATION

- current **Ph.D., Health and Human Performance**, Concordia University Chicago  
(anticipated graduation: 2019)
- 1999 **M.A., Biomechanics & Athletic Training**, San Diego State University  
(certified as an athletic trainer by the NATABOC in 2000)
- 1995 **B.S., Bioengineering**, University of California, San Diego

## WORK HISTORY

*December 2015 – present*

### **Vice President, Applications Development Motion Analysis Corporation, Santa Rosa, CA**

Lead development team in the design and testing of motion capture specific applications in the fields of clinical biomechanics, movement analysis, and sports analysis. Applications aimed at providing solutions using cutting edge 3D motion capture technology for gait analysis, running analysis, baseball pitching, baseball hitting, golf, footwear, and low back assessment.

*August 2015 – present*

### **Manager, Kinesiology Biomechanics Laboratory, Point Loma Nazarene University**

Direct biomechanics research for the students and faculty of the Department of Kinesiology. Design and maintain all aspects of motion analysis and electromyography instrumentation and software. Advise students on undergraduate and graduate student research in kinesiology and clinical biomechanics.

*January 2013 – December 2015*

### **Biomechanics Engineer Motion Analysis Corporation, Santa Rosa, CA**

Acted as lead biomechanics support engineer in human movement analysis for global company specializing in passive optical motion capture and analysis. Provided technical and expert consultation support to users in hospitals and universities on hardware and software methods used in biomechanics and gait analysis practice and research both remotely (San Diego) and on-site.

*June 2004 – June 2015*

### **Director, Center for Human Performance, Inc. (CHP) Motion Analysis Laboratory, Rady Children's Hospital, San Diego, CA**

Managed all aspects of research and engineering of the biomechanical research consulting firm. Developed and directed sports performance institute (CHP) in utilizing motion analysis to evaluate sports performance for enhancement and injury prevention. Established research and service based programs in sports medicine and athletic training. Actively pursued and obtained funding from private entities and industry to support ongoing research in sports medicine, footwear biomechanics, and clinical gait analysis. Presented research through journal publications and talks at scientific conferences. Created kinematic model for measuring upper-extremity motion used for the analysis of baseball pitching and the golf swing. Managed orthopedic biomechanics research facility that focused on in-vitro and pre-clinical orthopedic research, specifically in biomechanics of surgical procedures and instrumentation using engineering techniques. Supervised projects related to the materials testing of spinal instrumentation,

fracture fixation techniques, casting, ACL reconstruction techniques, and materials on cadaveric and benchtop models.

*March 2000 – Jan 2004*

**Bioengineer**

**Motion Analysis Laboratory, Rady Children’s Hospital, San Diego, CA**

Supervised all engineering activities of the lab, including the operation and maintenance of all systems used for kinematic and kinetic analyses, electromyography, energy expenditure, and network/database administration. Developed biomechanical software for kinematics, mechanical work, and data processing. Simultaneously managed multiple research projects in human locomotion, clinical orthopedics, and sports medicine. Served as technical, research, and educational resource for the lab and the Orthopedics department.

**FACULTY APPOINTMENTS**

*Aug 2015- present*

**Assistant Professor**

Department of Kinesiology, Point Loma Nazarene University, San Diego

KIN 327 – Applied Biomechanics

KIN 440 – Measurement, Statistics, and Evaluation of Human Performance (2-3 sections)

KIN 605 – Research Methods (Graduate)

KIN 615 – Biomechanical and Neurological Basis of Human Movement (Graduate)

KIN 650 – Seminar in Kinesiology (Graduate)

KIN 699 – Thesis (Graduate)

*Jan 2012 – December 2013*

**Adjunct Professor**

Department of Kinesiology, California State University, San Marcos

KINE 403 – Measurement and Evaluation in Kinesiology (3 sections)

*Aug 2005 – June 2015*

**Adjunct Professor**

School of Exercise and Nutritional Sciences, San Diego State University

ENS 306 – Biomechanics of Human Movement (Undergraduate)

ENS 436 – Functional Human Movement (Undergraduate)

ENS 603 – Measurement and Evaluation in Exercise Science (Graduate)

ENS 610 – Kinematics of Human Movement (Graduate)

ENS 611 – Kinetics of Human Movement (Graduate)

ENS 612 – Advanced Electromyography (Graduate)

<b>Academic Year</b>	<b>ENS/KIN Courses</b>	<b>FTE</b>
2005/2006	306	20%
2006/2007	306, 631/611	40%
2007/2008	306, 630/610	40%
2008/2009	611	20%
2010/2011	306, 436, 611, 612	60%
2011/2012	306, 603, 610	60%
2012/2013	306, 403, 440	60%
2013/2014	306	20%
2014/2015	306, 440	40%
2015/2016	327, 440, 605, 615, 650	80%

**PEER-REVIEWED RESEARCH**

Slenker, NR, Limpisvasti, O, Mohr, K, **Aguinaldo, AL**, ElAttrache, NS. 2014. Biomechanical comparison of the interval throwing progression and baseball pitching: Upper extremity stresses in training and rehabilitation. *American Journal of Sports Medicine*, 42(5), 1226-32.

Luker, KR, **Aguinaldo, AL**, Kenney, D, Cahill-Rowley, K, Ladd, AL. 2014. Functional task kinematics of the thumb carpometacarpal joint. *Clinical Orthopedics and Related Research*, 472(4), 1123-9.

Unfried, B, **Aguinaldo, AL**, Cipriani, D. 2013. What is the Influence of Cambered Running Surface on Lower Extremity Muscle Activity? *Journal of Applied Biomechanics*, 29(4), 421-7.

Yeh, PC, Mohr, K, **Aguinaldo, AL**, Gambardella, R, Shields, C. 2011. Knee bracing and its effect on the contralateral knee. *Journal Bone & Joint Surgery*, submitted.

**Aguinaldo, AL**, and Chambers, HG. 2009. Correlation of throwing mechanics with elbow valgus load in adult baseball pitchers. *American Journal of Sports Medicine*, 37(10), 2043-2048.

**Aguinaldo, AL**, Buttermore, J, and Chambers, HG. 2007. Effects of upper trunk rotation on shoulder joint torque between baseball pitchers of various levels. *Journal of Applied Biomechanics*, 23, 42-51.

**Aguinaldo, AL**, Clapper, M, Fithian, D, Paxton, L, Chambers, HG, and Sutherland, DH. 2006. Comparison by motion analysis of non-operative vs. operative treatment of Achilles Tendon ruptures. *Gait & Posture*, 24(S2), 228-230. (presented in part at the JEGM 2006, Amsterdam, Netherlands)

**Aguinaldo, AL**, Wyatt, MP, Sutherland, DH, Chambers, HG, 2004. Mechanical work performed on the body center of mass during walking in typical children and children with spastic diplegia. *Developmental Medicine and Child Neurology*, 46(S99): 23.

**Aguinaldo, AL**, Wyatt, MP, Chambers, HG, Sutherland, DH, 2003. Accuracy of the functional method in locating the joint center of the abnormal hip. In: *Proceedings of the Eighth Gait and Clinical Movement Analysis Meeting*. University of Delaware (Nominated for Best Paper Award)

**Aguinaldo, AL**, and Mahar, AT, 2003. Impact loading in running shoes with cushioning column systems. *Journal of Applied Biomechanics*, 19(4), 353-360.

**Aguinaldo, AL**, Mahar, AT, Litavish, MJ, and Morales, AO. 2002. Ground reaction forces in running shoes with two types of cushioning column systems. In K.E. Gianikellis (Ed.), *Proceedings of the XXth International Symposium on Biomechanics in Sports, Caceres, Spain* (pp. 592-595).

**Aguinaldo, AL**, Litavish, MJ, and Morales, AO. 2002. Comparison of transient force attenuation between three types of heel cushions used in athletic footwear. *Gait & Posture*, 16(S1), 100-101.

**Aguinaldo, AL** and Quigley, E. 2001. Influence of an electronic prosthetic knee on the kinematics of transfemoral amputee gait. *Gait & Posture*, 13(3), 298-299.

**PRESENTATIONS AND LECTURES**

Invited Lecturer, "Elbow Pitching Biomechanics and UCL Injury Risk Factors in Adult and Youth Pitchers," American Physical Therapy Association Combined Sections Meeting, Indianapolis, IN, February 5, 2015

Guest Lecturer, "An Introduction to Motion Analysis," Statics and Dynamics undergraduate class, Department of Bioengineering, University of California, San Diego, CA, February 16, 2012

Invited Speaker, "Clinical Gait Analysis," Grand Rounds, Department of Orthopedics, University of California San Diego Medical Center, San Diego, CA, September 14, 2011.

Keynote Speaker, "Sports Biomechanics and Motion Analysis," Educational Dinner Symposium, National Association of Orthopedic Nurses, San Diego, CA, September 8, 2010.

Invited Speaker, "How Trunk Rotation and Arm Slot Affect Arm Torque during Pitching," American Sports Medicine Institute Annual Injuries in Baseball Meeting, Houston, Texas, January 25, 2009.

Invited Lecturer, "A Comparison by Motion Analysis of ACL Reconstruction with a Patellar Tendon versus a Hamstring Tendon Autograft," Visiting Professor, Rady Childrens Hospital San Diego, April 17, 2008.

Guest Lecturer, "An Introduction to Motion Analysis," Statics and Dynamics undergraduate class, Department of Bioengineering, University of California, San Diego, CA, February 25, 2008

"Effects of sequential body motion on elbow valgus load during baseball pitching," Major League Baseball Winter Meetings, Orlando, FL, December 3, 2006.

Invited Lecturer, "Distal Upper Extremity Kinematic Modeling," Upper Extremity Symposium, Shriners Hospital for Children, Philadelphia, PA, July 21, 2006.

Visiting Professor, "Pitching Biomechanics," Department of Biomedical Engineering, Johns Hopkins University, Baltimore, MD, April 1, 2005.

Visiting Professor, "Injury Implications in Overhand Throwing," Chicago Memorial Medical Center, Chicago, IL, November 19, 2004.

Invited Lecturer, "Upper Extremity Kinematics," Upper Body Symposium, Gait and Clinical Movement Analysis Society Annual Meeting, Lexington, KY, May 2004.

"Functional Gait Limitations and Treatment of the Knee in Patients with Cerebral Palsy: Knee Biomechanics," American Academy of Cerebral Palsy and Developmental Medicine

- 56<sup>th</sup> Annual Meeting, New Orleans, LA, September, 2002
- 54<sup>th</sup> Annual Meeting, Toronto, Canada, September, 2000.

## FUNDING

Kinematics and kinetics during gait on a Computer Assisted Rehabilitation Environment (CAREN)	\$35,000 – U.S. Department of Defense (2010-2012) Role: Government Contract Award Recipient
Motion Analysis of the Easy Spirit Anti-Gravity Walking Shoe	\$19,000 – Jones Apparel Group (2010) Role: Principal Investigator; Designed protocol, organized budget, wrote and submitted proposal
Comparative Analysis of Toning Shoes on Walking Kinematics and Kinetics	\$60,000 – ACI International (2009-2010) Role: Principal Investigator; Designed protocol, organized budget, wrote and submitted proposal
Effects of Sequential Body Motion on Elbow	\$150,000 – Major League Baseball Medical Advisory

Valgus Load during Baseball Pitching	Committee (2005-2008) Role: Principal Investigator; Designed protocol, organized budget, wrote and submitted proposal
A Comparison by Motion Analysis of ACL Reconstruction with a Patellar Tendon versus a Hamstring Tendon Autograft	\$88,201 – Orthopedic Research & Education Foundation Grant (2003-2005) Role: Research Coordinator; Designed protocol, organized budget, wrote and submitted proposal
Impact Forces and Rearfoot Motion During Running in Shoes with Integrated Cushioning and Motion Control Systems	\$41,580 – Oakley, Inc. (2002-2003) Role: Principal Investigator; Designed protocol, organized budget, wrote and submitted proposal
Impact Loading in Running Shoes with Cushioning Column Systems	\$16,700 – LL International, LLC (2001-2002) Role: Principal Investigator; Designed protocol, organized budget, wrote and submitted proposal

### PROFESSIONAL ASSOCIATIONS

- Member - Editorial Board, Human Movement Science (2013-)
- Member - Editorial Board, Sports Biomechanics (2011-)
- Member - Editorial Board, Journal of Applied Biomechanics (2010-)
- Member - Editorial Board, Journal of Biomechanics (2004-)
- Member - Editorial Board, Gait & Posture (2003-2006)
- Member - National Athletic Trainers' Association (2006-)
- Member - International Society of Biomechanics in Sports (2001-)
- Member - Communications Committee, Gait and Clinical Movement Analysis Society (2001-2002)
- Member - Gait and Clinical Movement Analysis Society (2001-2011)
- Member - Whitaker Institute of Biomedical Engineering of UC San Diego (1998-2001)