VSR PUBLICATIONS

Conference and Journal Articles

General

Knake, L., Mathai, A., Marler, T., Farrell, K., Johnson, R., & Abdel-Malek, K. (2010, July). *New capabilities for vision-based posture prediction*. Paper presented at the Applied Human Factors and Ergonomics Conference, Miami, FL.

Xiang, Y., Arora, J.S., & Abdel-Malek, K. (2010). Optimization-based prediction of asymmetric human gait. *Journal of Biomechanics 44*(4), 683-693.

Abdel-Malek, K., Arora, J., Frey Law, L., Swan, C., Beck, S., Xia, T., Bhatt, R., Kim, J., Xiang, Y., Rasmussen, M.K., Murphy, C., Laake, A., Mathai, A., Marler, T., Yang, J., & Obusek, J. (2008, June). *Santos: A digital human in the making*. Paper presented at the IASTED International Conference on Applied Simulation and Modeling, Corfu, Greece.

Abdel-Malek, K., Yang, J., Kim, J. K., Marler, T., Beck, S., Swan, C., Frey-Law, Mathai, A., Murphy, C., Rahmatalla, S., & Arora, J. (2007, July). Development of the virtual human Santos. In *Proceedings of the First International Conference on Digital Human Modeling, Proceedings* (pp. 490-499), Berlin: Springer-Verlag.

Yang, J., Kim, J. H., Abdel-Malek, K., Marler, T., Beck, S., & Kopp, G. R. (2007). A new digital human environment and assessment of vehicle interior design. *Computer-Aided Design, 39*, 548-558.

Yang, J., Man, X., Xiang, Y., Kim, H., Patrick, A., Swan, C., Abdel-Malek, K., & Arora, J. (2007). *Newly developed functionalities for the virtual human Santos* (SAE Paper No. 2007-01-0465). Warrendale, PA: SAE International.

Abdel-Malek, K., Arora, J., Yang, J., Marler, T., Beck, S., Swan, S., Frey-law, L., Mathai, A., Rahmatalla, S., & Patrick, A. (2006). *Santos: A Physics-based Digital Human Simulation Environment*. Paper presented at the 50th Annual Meeting of the Human Factors and Ergonomics Society, San Francisco, CA.

Abdel-Malek, K., Yang, J., Marler, T., Beck, S., Mathai, A., Zhou, X., Patrick, A., & Arora, J. (2006). Towards a new generation of virtual humans. *International Journal of Human Factors Modelling and Simulation*, *1*(1), 2-39.

Yang, J., Marler, T., Beck, S., Kim, J., Wand, Q., Zhou, X., Pena Pitarch, E., Farrell, K., Patrick, A., Potratz, J., Abdel-Malek, K., Arora, J. S., & Nebel, K. (2006). *New Capabilities for the Virtual Human Santos*. Paper presented at the SAE 2006 World Congress, Detroit, MI.

Yang, J., Marler, R.T., Kim, H. J., Farrell, K., Mathai, A., Beck, S., Abdel-Malek, K., Arora, J., & Nebel, K. (2005, April). *Santos: A new generation of virtual humans*. Paper presented at the SAE 2005 World Congress, Detroit, MI.

Abdel-Malek, K., Yang, J., Kim, J., Marler, T., Beck, S., & Nebel, K. (2004, November). *Santos: A virtual human environment for human factors assessment*. Paper presented at the 24th Army Science Conference: Transformational Science and Technology for the Current and Future Force, Orlando, FL.

Farrell, K., Yang, J., & Abdel-Malek, K. (2004, August). *Santos: A new interactive virtual human*. Paper presented at SIGGRAPH 2004 Real-Time 3DX: Demo or Die, Los Angeles, CA.

Posture Prediction

Johnson, R., Fruehan, C., Schikore, M., Marler, T., & Abdel-Malek, K. (2010, July). *New developments with collision avoidance for posture prediction*. Paper presented at the *3rd International Conference on Applied Human Factors and Ergonomics*, Miami, FL.

Knake, L., Mathai, A., Marler, T., Farrell, K., Johnson, R., & Abdel-Malek, K. (2010, July). *New capabilities for vision-based posture prediction*. Paper presented at the *3rd International Conference on Applied Human Factors and Ergonomics*, Miami, FL.

Marler, T., Knake, L., & Johnson, R. (2010, July). *Optimization-based posture prediction for analysis of box-lifting tasks*. Paper presented at the *3rd International Conference on Digital Human Modeling*, Orlando, FL.

Yang, J., Marler, T., & Rahmatalla, S. (2011). Multi-objective optimization method for kinematic posture prediction: development and validation. *Robotica 29*, 245-253.

Johnson, R., Smith, B. L., Penmatsa, R., Marler, T., & Abdel-Malek, K. (2009, June). *Real-time obstacle avoidance for posture prediction*. Paper presented at the *SAE Digital Human Modeling Conference*, Goteborg, Sweden.

Liu, Q., Marler, T., Yang, J., Kim, J., & Harrison, C. (2009). Posture prediction with external loads – a pilot study. *SAE International Journal of Passenger Cars – Mechanical Systems*, 2(1), 1014-1023.

Rochambeau, B., Marler, T., & Abdel-Malek, K. (2008, June). *Multiple user-defined end-effectors with shared memory communication for posture prediction*. Paper presented at the SAE Digital Human Modeling Conference, Pittsburgh, PA.

Smith, B., Marler, T., & Abdel-Malek, K. (2008, June). *Studying visibility as an objective for posture prediction*. Paper presented at the SAE Digital Human Modeling Conference, Pittsburgh, PA.

Yang, J., Verma, U., Penmatsa, R., Marler, T., Beck, S., Rahmatalla, S., Abdel-Malek, K., & Harrison, C. (2008, April). *Development of a zone differentiation tool for visualization of postural comfort*. Paper presented at the SAE 2008 World Congress, Detroit, MI.

Yang, J., Rahmatalla, S., Marler, T., Abdel-Malek, K., & Harrison, C. (2007, July). *Validation of predicted posture for the virtual human Santos*. Paper presented at the *12th International Conference on Human-Computer Interaction*, Beijing, China.

Marler, T., Yang, J., Rahmatalla, S., Abdel-Malek, K., & Harrison, C. (2007, June). *Validation methodology development for predicted posture*. Paper presented at the SAE Digital Human Modeling Conference, Seattle, WA.

Marler, R. T., Farrell, K., Kim, J., Rahmatalla, S., & Abdel-Malek, K. (2006). *Vision performance measures for optimization-based posture prediction*. Paper presented at the SAE Human Modeling for Design and Engineering Conference, Lyon, France.

Yang, J., Marler, T., Beck, S., Abdel-Malek, K., & Kim, H. -J. (2006). Real-time optimal-reach posture prediction in a new interactive virtual environment. *Journal of Computer Science and Technology*, *21*(2), 189-198.

Yang, J., Pena-Pitarch, E., Kim, J., & Abdel-Malek, K. (2006) Posture prediction and force/torque analysis for human hand (SAE Paper No. 2006-01-2326). In *Proceedings of the SAE 2006 Digital Human Modeling for Design and Engineering Conference*.

Yang, J., Sinokrot, T., Abdel-Malek, K., & Nebel, K. (2006). Optimization-based workspace zone differentiation and visualization for Santos (SAE Paper No. 2006-01-0696). In *Proceedings of the SAE 2006 Digital Human Modeling for Design and Engineering Conference*.

Marler, R. T., Yang, J., Arora, J. S., & Abdel-Malek, K. (2005, August). *Study of bi-criterion upper body posture prediction using pareto optimal sets*. Paper presented at the IASTED International Conference on Modeling, Simulation, and Optimization, Oranjestad, Aruba.

Marler, R. T., Rahmatalla, S., Shanahan, M., & Abdel-Malek, K. (2005, June). *A new discomfort function for optimization-based posture prediction*. Paper presented at the SAE Human Modeling for Design and Engineering Conference, Iowa City, IA.

Farrell, K., Marler, R. T., & Abdel-Malek, K. (2005, June). *Modeling dual-arm coordination for posture: an optimization-based approach*. Paper presented at the SAE Human Modeling for Design and Engineering Conference, Iowa City, IA.

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Farrell, K., & Marler, R. T. (2004). *Optimization-based kinematic models for human posture*. Virtual Soldier Research Program Technical Report No. VSR-04.11. Iowa City, IA: The University of Iowa.

Marler, R.T., & Yang, J. (2004). *Study of a bi-criterion posture prediction problem using pareto optimal sets*. Virtual Soldier Research Program Technical Report No. VSR-04.07, Iowa City, IA: The University of Iowa.

Abdel-Malek, K., Yu, W., Jaber, M., & Duncan, J. (2002). Realistic posture prediction for maximum dexterity. *SAE Transactions Journal of Passenger Cars-Mechanical Systems 110*(6), 2241-2249.

Abdel-Malek, K., Wei, Y., Mi, Z., Tanbour, E., & Jaber, M. (2001). Posture prediction versus inverse kinematics. In *Proceedings of the 2001 ASME Design Engineering Technical Conferences and Computers and Information in Engineering Conference* (pp. 37-45). Pittsburgh, PA.

Modeling Muscle Force, Strength Fatigue

Avin, K., Naughton, M.R., Ford, B.W., Moore, H.E., Monitto-Webber, M.N., Stark, A.M., Gentile, A.J., & Frey Law, L.A. (2010). Sex differences in fatigue resistance are muscle group dependent. *Med & Sci Sports & Exerc 42*(10), 1943-1950.

Frey Law, L.A., & Avin, K. (2010). Endurance time is joint-specific: a modeling and meta-analysis investigation. *Ergonomics 53*(1), 109-129.

Frey Law, L.A., Krishnan, C., & Avin, K.G. (2010). Modeling nonlinear errors in surface electromyography due to baseline noise: A new methodology. *J Biomechanics 44*(1), 202-205.

Frey Law, L.A., Lee, J.E., McMullen, T., & Xia, T. (2010). Relationships between maximum holding time and ratings of pain and exertion differ for static and dynamic tasks. *Applied Ergonomics 42*(1), 9-15.

Avin, K., & Frey Law, L.A. (2009, August). *Endurance time is joint-specific: a modeling and meta-analysis investigation*. Paper presented at the American Society for Biomechanics Annual Scientific Meeting, Penn State University, PA.

Avin, K., Gentile, A.J., Ford, B., Moore, H., Monitto-Webber, M., Naughton, M., Norland, G., Stark, A., & Frey Law, L.A. (2009, August). *Sex differences in fatigue at the elbow and ankle*. Paper presented at the APTA Section on Research Retreat, CA.

Pierce, G., & Frey-Law L. (2008, October). *Isokinetic 3D shoulder strength assessment: internal external rotation strength surfaces*. Paper presented at the Biomedical Engineering Society Conference, St. Louis, MO.

Pierce, G., & Frey Law, L.A. (2008, August). *3-D strength surfaces for shoulder internal and external rotation*. Paper presented at the North American Congress on Biomechanics (NACOB), Ann Arbor, MI.

Xia, T. & Frey Law, L.A. (2008, August). *Modeling muscle fatigue for multiple joints*. Paper presented at the North American Congress on Biomechanics (NACOB), Ann Arbor, MI.

Frey Law, L.A., Lee, J., McMullen, T., Baier, T., Goodall, K., McEchron, C., Schlichte, A., Steege, C., Breuer, S., Craine, M., Gustafson, E., Mueller, K., & Root, S. (2008, February). *Perceived pain and exertion during fatigue are distinct*. Paper presented at the APTA Combined Sections Meeting, Nashville, TN.

Xia, T. & Frey Law, L.A. (2008, January). *Multiscale approach to muscle fatigue modeling*. Paper presented at the Pacific Symposium on Biocomputation, Big Island, HI.

Xia, T., & Frey Law, L.A. (2008). A theoretical approach for modeling peripheral muscle fatigue and recovery. *Journal of Biomechanics 41*(14), 3046-3052.

Frey Law, L.A., Laake, A., & Delmonaco, C. (2007, August). *Contributions of passive-tension vs. inertial effects on gravity correction for strength training*. Paper presented at the American Society for Biomechanics, Palo Alto, CA.

Laake, A., & Frey Law, L.A. (2007, August). *Modeling 3D knee torque surfaces for males and females*. Paper presented at the American Society for Biomechanics, Palo Alto, CA.

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Yang, Q., Han, R.P.S., & Frey Law, L.A. (2006, July). *Simulating motor units for fatigue in arm muscles in digital humans*. Paper presented at the 2006 Digital Human Modeling for Design and Engineering Conference, SAE, Lyon, France.

Bhatti, M., Vignes, R., & Han, R. (2005). *Muscle forces and fatigue in a digital human environment* (SAE Paper No. 05DHM-73). Warrendale, PA: SAE International.

Zhou, X., & Lu, J. (2005). *Biomechanical analysis of skeletal muscle in an interactive digital human system* (SAE Paper No. 05DHM-49). Warrendale, PA: SAE International.

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Bhatti, M., Vignes, R., Han, R., & Horn, N. (2004, December). *Incorporating muscle fatigue in a virtual soldier environment*. Abstract no. 1546 presented at the International Soldier Systems Conference, Boston, MA.

Motion Prediction

Xiang, Y., Arora, J.S., Rahmatalla, S., Bhatt, R., Marler, T., & Abdel-Malek, K. (2009) Human lifting simulation using multi-objective optimization approach. *Multibody Systems Dynamics 23*(4), 431-451.

Kim, J., Xiang, Y., Bhatt, R., Yang, J., Chung, H.J., Patrick, A., Mathai, A., Arora, J. Abdel-Malek, K., & Obusek, J. (2008). *General biped motion and balance of a human model* (SAE Paper No. 2008-01-1932). Warrendale, PA: SAE International.

Kim, J., Abdel-Malek, K., Yang, J., & Nebel, K. (2006, April). *Motion prediction and inverse dynamics for human upper extremities*. Paper presented at the 2006 SAE DHM Conference, Detroit, MI.

Kim, J., Abdel-Malek, K., Yang, J., & Nebel, K. (2004, December). *Dynamic motion prediction and energy level determination for a virtual soldier's upper body*. Paper presented at the International Soldier Systems Conference, Boston, MA.

Abdel-Malek, K., Yang, J., Mi, Z., Patel, V.C., & Nebel, K. (2004, June). *Human upper body motion prediction*. Paper presented at Conference on Applied Simulation and Modeling (ASM) 2004*,* Rhodes, Greece.

Alternative Formulations

Wang, Q., Xiang, Y., Arora, J., & Abdel-Malek, K. (2007, April). *Alternative formulations for optimization-based human gait planning* (Paper No. AIAA 2007-1909). Paper presented at the 48th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Honolulu, HI.

Wang, Q., & Arora, J. (2006, May). *An evaluation of some alternative formulations for transient dynamic response optimization* (Paper No. AIAA 2006-2052). Paper presented at the 47th AIAA/ASME/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Newport, RI.

Wang, Q., Xiang, Y., Kim, H., Arora, J., & Abdel-Malek, K. (2005). *Alternative formulations for optimization-based digital human motion prediction* (SAE Paper No. 05DHM-61). Warrendale, PA: SAE International.

Fundamentals

Xiang, Y., Arora, J., & Abdel-Malek, K. (2009). Optimization-based motion prediction of mechanical systems: sensitivity analysis. *Struct Multidisc Optim 37*(6), 595-608.

Kim, J., Yang, J., & Abdel-Malek, K. (2007, September). *Load-effective dynamic motion planning for redundant manipulators* (Paper No. DETC2007-35393). Paper presented at the ASME 2007 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Las Vegas, NV.

Joint Constraint Loads

Kim, J., Yang, J., & Abdel-Malek, K. (2008). A novel formulation for determining joint constraint loads during optimal dynamic motion of redundant manipulators in DH representation. *Multibody Syst Dyn 19*, 427-451.

Gait/Walking

Xiang, Y., Arora, J.S., & Abdel-Malek, K. (2010). Physics-based modeling and simulation of human walking: a review of optimization-based and other approaches. *Structural and Multidisciplinary Optimization 42*(1), 1-23.

Xiang, Y., Arora, J., Rahmatalla, S., & Abdel-Malek, K. (2009). Optimization-based dynamic human walking prediction: one step formulation. *International Journal for Numerical Methods in Engineering 79*(6), 667-695.

Kim, H., Wang, Q., Rahmatalla, S., Swan, C., Arora, J., Abdel-Malek, K., & Assouline, J. (2008). Dynamic motion planning of 3D human locomotion using gradient-based optimization. *Journal of Biomechanical Engineering 130*(3):031002.

Rahmatalla, S., Xiang, Y., Smith, R., Li, J., Meusch, J., Bhatt, R., Swan, C., Arora, J., & Abdel-Malek, K. (2008). *A validation protocol for predictive human locomotion* (SAE Paper No. 08DHM-0024/2008-01-1855). Warrendale, PA: SAE International.

Xiang, Y., Chung, H.J., Mathai, A., Rahmatalla, S., Kim, J., Marler, T., Beck, S., Yang, J., Arora, J.S., Abdel-Malek, K., & Obusek, J. (2007, June). *Optimization-based dynamic human walking prediction*. Paper presented at the SAE Digital Human Modeling Conference, Seattle, WA.

Kim, H., Horn, E., Arora, J., & Abdel-Malek, K. (2005). *An optimization-based methodology to predict digital human gait motion* (SAE Paper No. 05DHM-54). Warrendale, PA: SAE International.

Lifting

Xiang, Y., Arora, J.S., Rahmatalla, S., Marler, T., Bhatt, R., & Abdel-Malek, K. (2010). Human lifting simulation using a multi-objective optimization approach. *Multibody System Dynamics 23*(4), 431-451.

Xiang, Y., Rahmatalla, S., Bhatt, R., Kim, J., Chung, H. J., Mathai, A., Beck, S., Marler, T., Yang, J., Arora, J.S., & Abdel-Malek, K. (2008, June). *Optimization-based dynamic human lifting prediction*. Paper presented at the SAE Digital Human Modeling Conference, Pittsburgh, PA.

Kim, J., Abdel-Malek, K., Yang, J., Marler, T., & Nebel, K. (2005, November). *Lifting posture analysis in material handling using virtual humans* (Paper No. IMECE2005-81801). Paper presented at the 2005 ASME International Mechanical Engineering Congress and Exposition, Orlando, FL.

Pushing/Pulling

Kim, J.H., Abdel-Malek, K., Yang, J., & Marler, R.T. (2006). Prediction and analysis of human motion dynamics performing various tasks. *International Journal of Human Factors Modelling and Simulation*, *1*(1), 69-117.

Stair Climbing

Bhatt, R., Xiang, Y., Kim, J., Mathai, A., Penmatsa, R., Chung, H-J., Kwon, H-J., Patrick, A., Rahmatalla, S., Marler, T., Beck, S., Yang, J., Arora, J. S., Abdel-Malek, K., & Obusek, J.P. (2008, June). *Dynamic optimization of human stair-climbing motion*. Paper presented at the SAE Digital Human Modeling Conference, Pittsburgh, PA.

Running

Chung, H-J., Xiang, Y., Mathai, A., Rahmatalla, S., Kim, J., Marler, T., Beck, S., Yang, J., Arora, J., & Abdel-Malek, K. (2007). *A robust formulation for prediction of human running* (SAE Paper No. 2007-01-2490). Warrendale, PA: SAE International.

Hand modeling

Goussous, F., Marler, T., & Abdel-Malek, K. (2009). A new methodology for human grasp prediction. *IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans 39*(2), 369-380.

Pitarch, E.P., Yang, J., Abdel-Malek, K., & Marler, T. (2005, September). *Hand grasping strategy for virtual humans*. Paper presented at the 3rd IASTED International Conference on Biomechanics, Benidorm, Spain.

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Clothing

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Optimization

Marler, R.T., & Arora, J.S. (2010). The weighted sum method for multi-objective optimization: some insights. *Structural and Multidisciplinary Optimization 41*(6), 853-862.

Abdel-Malek, K., Mi, Z., Yang, J., & Nebel, K. (2006). Optimization-based trajectory planning of human upper body. *Robotica 24*(6), 683-696.

Kim, J., Yang, J., Abdel-Malek, K., & Nebel, K. (2005). Task-based vehicle interior layout design using optimization method to enhance safety. In D. Trevisani and A. Sisti (Eds.) *Enabling Technologies for Simulation Science IX* (pp. 54-65). Bellingham, WA: SPIE.

Abdel-Malek, K., Mi, Z., Yang, J., & Nebel, K. (2005). Optimization-based layout design. *Journal of Applied Bionics and Biomechanics 2*(3/4), 187-196.

Kim, J., Abdel-Malek, K., Yang, J., & Nebel, K. (2005). Optimization-based dynamic motion simulation and energy consumption prediction for a digital human. *Journal of Passenger Car-Electronic and Electronical Systems 114*(7), 797-806.

Marler, R.T., & Arora, J.S. (2004). Survey of multi-objective optimization methods for engineering. *Struct Multidisc Optim 26*, 369-395.

Marler, T., & Arora, J. (2004, August). *Study of multi-objective optimization using simplified crash models*. Paper presented at the 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Albany, NY.

Kim, J., Abdel-Malek, K., Mi, Z., & Nebel, K. (2004, June). *Layout design using an optimization-based human energy consumption formulation*. Paper presented at SAE Digital Human Modeling for Design and Engineering, Rochester, MI.

Wang, Q., & Arora, J. (2004, April). *Alternate formulations for structural optimization*. Paper presented at the 45th AIAA/ASME/AHS/ASC Structures, Structural Dynamics and Materials Conference, Palm Springs, CA.

Validation

Rahmatalla, S., Xiang, Y., Smith, R., Meusch, J., Li, J., Marler, T., & Smith, B. (2009, June). *Validation of lower-body posture prediction for the virtual human model Santos™*. Paper presented at the SAE Digital Human Modeling Conference, Goteborg, Sweden.

Other

Mathai, A., Marler, T., Farrell, K., Meusch, J., Taylor, A., Beck, S., Abdel-Malek, K., Corner, B., & MacKiewicz, J. (2010, September). *A new armor simulation and evaluation toolkit*. Paper presented at the Personal Armor Systems Symposium, Quebec City, Canada.

Rahmatalla, S., Smith, R., Meusch, J., Xia, T., Marler, T., & Contratto, M. (2010). Quasi-static discomfort measures in whole-body vibration. *Industrial Health 48*(5), 645-653.

Yang, J., Abdel-Malek, K., & Nebel, K. (2005). On the determination of driver reach and barriers. *International Journal of Vehicle Design 37*(4), 253-273.

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Abdel-Malek, K., Yang, J., Yu, W., & Duncan, J. (2004, September). *Human performance measures: mathematics*. Paper presented at the ASME Design Engineering Technical Conferences (DAC 2004), Salt Lake City, UT.

Rahmatalla, S., & Swan, C. (2004, August). *Sparse monolithic complaint mechanisms using continuum structural topology optimization*. Paper presented at the 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Albany, NY.

Rahmatalla, S., & Swan, C. (2004, August). *Topological design and control of path-following complaint mechanisms*. Paper presented at the 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Albany, NY.

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Alexander, R.M. (1997). A minimum energy cost hypothesis for human arm trajectories. *Biological Cybernetics 76*, 97-105.

Theses

Alternative Formulations

Wang, Q. (2006). *A study of alternative formulations for optimization of structural and mechanical systems subjected to static and dynamic loads.* Unpublished doctoral dissertation, The University of Iowa, Iowa City, IA.

Clothing

Man, X. (2006). *A mathematical and computational multiscale clothing modeling framework*. Unpublished doctoral dissertation, The University of Iowa, Iowa City, IA.

Rasmussen, M. (2008). *An analytical framework for the preparation and animation of a virtual mannequin for the purpose of mannequin-clothing interaction modeling.* Unpublished master's thesis, The University of Iowa, Iowa City, IA.

Collision Avoidance

Muhs, J. (2005). *A geodesics-based model for collision avoidance path prediction.* Unpublished master's thesis, The University of Iowa, Iowa City, IA.

Dynamic Walking

Xiang, Y. (2008). *Optimization-based dynamic human walking prediction.* Unpublished doctoral dissertation, The University of Iowa, Iowa City, IA.

Grasping

Goussous, F. (2007). *Grasp planning for digital humans*. Unpublished master's thesis, The University of Iowa, Iowa City, IA.

Pitarch, E. (2007). *Virtual human hand: grasping strategy and simulation.* Unpublished doctoral dissertation, Universitat Politècnica de Catalunya, Barcelona, Spain.

Hand Mechanism

Potratz, J. (2005). *Design, actuation, and control of a complex hand mechanism.* Unpublished master's thesis, The University of Iowa, Iowa City, IA.

Kinematic Motion

Mi, Z. (2004). *Task-based prediction of upper body motion.* Unpublished doctoral dissertation, The University of Iowa, Iowa City, IA.

Marler, R.T. (2005). *A study of multi-objective optimization methods for engineering applications.* Unpublished doctoral dissertation, The University of Iowa, Iowa City, IA.

Muscle Fatigue

Vignes, R. (2004). *Modeling muscle fatigue in digital humans.* Unpublished master's thesis, The University of Iowa, Iowa City, IA.

Muscle Force and Activation

Patrick, A. (2005). *Development of a 3D model of the human arm for real time interaction and muscle activation prediction.* Unpublished master's thesis, The University of Iowa, Iowa City, IA.

Physiology

Mathai, A. (2005). *Towards physiological modeling in virtual humans.* Unpublished master's thesis, The University of Iowa, Iowa City, IA.

Posture Prediction

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Swept Volumes and Reachability

Yang, J. (2003). *Swept volumes: theory and implementations.* Unpublished doctoral dissertation, The University of Iowa, Iowa City, IA.

Workspace

Sinokrot, T. (2005). *Workspace visualization and analysis for virtual humans.* Unpublished master's thesis, The University of Iowa, Iowa City, IA.

Other

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