Scientific Publications

Notes: Most of these articles can be downloaded from http://www.ambarish.com.
All Google Scholar citations (only >20 are indicated here) are from November, 2013.
Total Google Scholar citations: 4260

Journal Articles

1. J. Chiu and A. Goswami
   Critical Hitch Angle for Jack-Knife Avoidance During Slow Backing-up of Vehicle-Trailer System

   Direction Changing Fall Control in Humanoid Robots: Theory and Experiments

   Centroidal Dynamics of Humanoid Robots

4. A. Sanyal and A. Goswami
   Dynamics and Balance Control of the Reaction Mass Pendulum (RMP): A 3D Inverted Pendulum with Extended Body Inertia

5. S.-H Lee and A. Goswami
   Fall on Backpack: Damage Minimizing Humanoid Fall on Targeted Body Segment Using Momentum Control

6. S.-H Lee and A. Goswami
   A Momentum-based Balance Controller for Humanoid Robots on Non-level and Non-stationary Ground

7. T. Koolen, T. de Boer, J. Rebula, A. Goswami and J. Pratt
   Capturability Based Analysis and Control of Legged Locomotion, Part 1: Application to Three Simple Gait Models

8. G. Aguirre-Ollinger, J. E. Colgate, M. A. Peshkin, and A. Goswami
   Inertia Compensation Control of a One-Degree-of-Freedom Exoskeleton for Lower-Limb Assistance: Initial Experiments
9. S. Kalyanakrishnan and A. Goswami
Learning to Predict Humanoid Fall

10. G. Aguirre-Ollinger, J. E. Colgate, M. A. Peshkin, and A. Goswami
Design of an Active 1-DOF Lower-Limb Exoskeleton with Inertia Compensation

11. G. Aguirre-Ollinger, J. E. Colgate, M. A. Peshkin, and A. Goswami
A 1-DOF Assistive Exoskeleton with Inertia Compensation: Effects on the Agility of Leg Swing Motion

12. R. C. Browning, J. R. Modica, R. Kram and A. Goswami
The effects of adding mass to the legs on the energetics and biomechanics of walking
Google Scholar citation: 88

13. M. B. Popovic, A. Goswami, and H. Herr
Ground Reference Points in Legged Locomotion: Definitions, Biological Trajectories and Control Implica-
tions
Google Scholar citation: 137

14. S. Goldenstein, M. Karavelas, D. Metaxas, L. Guibas, E. Aaron, and A. Goswami
Scalable Nonlinear Dynamical Systems for Agent Steering and Crowd Simulation
Google Scholar citation: 59

15. D. Tolani, A. Goswami and N. I. Badler
Real-Time Inverse Kinematics Techniques for Anthropomorphic Limbs
Google Scholar citation: 495

16. N. I. Badler, D. N. Metaxas, G. Huang, A. Goswami and S. Huh
Dynamic Simulation for Zero-Gravity Activities

17. A. Goswami and M. A. Peshkin
Mechanically implementable accommodation matrices for passive force control

18. A. Goswami
Postural stability of biped robots and the foot rotation indicator (FRI) point
Google Scholar citation: 414

19. A. Goswami, B. Thuilot, and B. Espiau
A study of the passive gait of a compass-like biped robot: symmetry and chaos
Google Scholar citation: 359

20. A. Goswami
A new gait parameterization technique by means of cyclogram moments:
Application to human slope walking
Google Scholar citation: 66
21. A. Goswami, B. Espiau, and A. Keramane
   Limit cycles in a passive compass gait biped and passivity-mimicking control laws
   Google Scholar citation: 288

22. T. C. Kienzle III, S. D. Stulberg, M. A. Peshkin, A. Quaid, J. Lea, A. Goswami, and C-H Wu
   Total Knee Replacement
   Google Scholar citation: 42

23. A. Goswami and J. R. Bosnik
   On a relationship between the physical features of robotic manipulators and the kinematic parameters produced by numerical calibration

24. A. Goswami, A. Quaid, and M. A. Peshkin
   Identifying robot parameters using partial pose information
   *IEEE Control Systems* (invited article), October 1993.
   Google Scholar citation: 26
Book Sections and Reports

1. S-H. Lee and A. Goswami
   The reaction mass pendulum (RMP) model for humanoid robot gait and balance control
   Humanoid Robots (Editor: Ben Choi)
   In-Tech, Austria, February 2009.

2. A. Goswami and E. Cordier
   Moment-based parameterization of evolving cyclograms on gradually changing slopes
   Computer Methods in Biomechanics & Biomedical Engineering - v.2
   Middleton J., Jones M.L. and Pande G.N. Eds.

3. A. Goswami, B. Thuilot, and B. Espiau
   Compass-like biped robot Part I: Stability and bifurcation of passive gaits
   INRIA Research Report No. 2996, October 1996.
   Google Scholar citation (October 1, 2010): 206

4. T. C. Kienzle III, S. D. Stulberg, M. A. Peshkin, A. Quaid, J. Lea, A. Goswami, and C-H Wu
   A computer-assisted total knee replacement surgical system using a calibrated robot
   Google Scholar citation: 51
Refereed Conference Proceedings

1. J. Chiu and A. Goswami
   Design of A Wearable Scissored-Pair Control Moment Gyroscope (SP-CMG) for Human Balance Assist
   ASME 2014 International Design Engineering Technical Conferences (IDETC), Buffalo, NY, August 2014

2. S.-K. Yun and A. Goswami
   Tripod Fall: Concept and Experiments of a Novel Approach to Humanoid Robot Fall Damage Reduction
   International Conference on Robotics and Automation (ICRA), 2014, Hongkong, May 2014

3. F. L. Moro, M. Gienger, A. Goswami, N. G. Tsagarakis and D. G. Caldwell
   An Attractor-based Whole-Body Motion Control (WBMC) System for Humanoid Robots
   Humanoids 2013, Atlanta, GA, October 2013

4. J. Chiu and A. Goswami
   Driver Assist for Backing-Up a Vehicle with a Long-Wheelbase Dual-Axle Trailer
   The 11th International Symposium on Advanced Vehicle Control (AVEC ’12), Seoul, Korea, September 2012

5. S.-K. Yun and A. Goswami
   Humanoid Robot Safe Fall Experiments using Aldebaran NAO

6. A. K. Sanyal and A. Goswami
   Dynamics and Control of the Reaction Mass Pendulum (RMP) as a 3D Multibody System:
   Application to Humanoid Modeling
   2011 ASME Dynamic Systems and Control Conference (DSCC)
   Arlington, VA, October 2011.

7. S.-K. Yun and A. Goswami
   Momentum-Based Reactive Stepping Controller on Level and Non-level Ground for Humanoid Robot
   Push Recovery
   iROS 2011, San Francisco, California, September 2011.

8. S-H. Lee and A. Goswami
   Fall on Backpack: Damage Minimizing Humanoid Fall on Targeted Body Segment Using Momentum
   Control
   ASME 2011 International Design Engineering Technical Conferences (IDETC)

9. S-H. Lee and A. Goswami
   Ground reaction force control at each foot: A momentum-based humanoid balance controller for non-
   level
   and non-stationary ground
   IROS 2010, Taipei, Taiwan, October 2010.

10. A. Dutta and A. Goswami
    Human postural model that captures rotational inertia
    The 33rd Annual Meeting of the American Society of Biomechanics , ASB 2010, Providence, Rhode
    Island, USA, August, 2010.

11. S. Kalyanakrishnan and A. Goswami
    Predicting falls of a humanoid robot through machine learning
    Innovative Applications of Artificial Intelligence, IAAI-10, Atlanta, Georgia, USA, July, 2010.
12. U. Nagarajan and A. Goswami
Generalized Direction Changing Fall Control of Humanoid Robots Among Multiple Objects

13. S.-K. Yun, A. Goswami and Y. Sakagami
Safe Fall: Humanoid robot fall direction change through intelligent stepping and inertia shaping
Google Scholar citation: 22

14. S. Stramigioli, V. Duindam, G. van Oort and A. Goswami
Compact Analysis of 3D Bipedal Gait Using Geometric Dynamics of Simplified Models

15. A. Goswami
Kinematic and dynamic analogies between planar biped robots and the reaction mass pendulum (RMP) model

16. D. Orin and A. Goswami
Centroidal Momentum Matrix of a Humanoid Robot: Structure and Properties

17. J. Rebula, J. Pratt and A. Goswami
Learning Capture Point for Improved Humanoid Push Recovery
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18. G. Aguirre-Ollinger, J. E. Colgate, M. A. Peshkin, and A. Goswami
A 1-DOF Assistive Exoskeleton with Virtual Negative Damping: Effects on the Kinematic Response of the Lower Limbs

19. G. Aguirre-Ollinger, J. E. Colgate, M. A. Peshkin, and A. Goswami
Active impedance control of a lower-limb assistive exoskeleton
10th Int. Conf. on Rehabilitation Robotics (ICORR’07), Noordwijk, the Netherlands, Jun 13-15 2007, 2007.
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20. S-H. Lee and A. Goswami
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21. J. Pratt, J. Carff, S. Drakunov and A. Goswami
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Humanoids06, Genoa, Italy, December 2006.
Google Scholar citation: 175

22. M. Abdallah and A. Goswami
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23. R. C. Browning, J. Modica, R. Kram and A. Goswami
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24. **A. Goswami** and V. Kallem  
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Google Scholar citation: 145

25. **A. Goswami**  
Kinematic quantification of gait symmetry based on bilateral cyclograms  

26. S. Goldenstein, M. Karavelas, D. Metaxas, L. Guibas, and **A. Goswami**  
Scalable Dynamical Systems for Multi-Agent Steering and Simulation  
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27. H. Sun, **A. Goswami** and D. Metaxas  
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30. M. Mata-Jimenez, B. Brogliato, and **A. Goswami**  
On the control of mechanical systems with dynamic backlash  
*CDC Conf.*, San Diego, CA, December 1997.

31. M. Mata-Jimenez, B. Brogliato, and **A. Goswami**  
Analysis of PD control of mechanical systems with dynamic backlash  
*2nd Int. Symp. MV2 on Active Control in Mechanical Engineering*, Lyon, France, October 1997.

32. C. Canudas de Wit, L. Roussel, and **A. Goswami**  
Periodic stabilization of a 1-dof hopping robot over nonlinear compliant surface  
*IFAC Symp. on Robot Control (SyRoCo)*, Nantes, France, September 1997.

33. **A. Goswami** and E. Cordier  
Moment-based parameterization of cyclograms of slope-walking  
*XVIIth Congress of the Int. Society of Biomechanics*, Tokyo, Japan, August 1997  
(finalist for the Best Young Investigator award).

34. B. Espiau and the BIP team  
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*8th Int. Conf. on Advanced Robotics (ICAR)*, Monterey, CA, July 1997.

35. C. Canudas de Wit, L. Roussel, and **A. Goswami**  
Comparative study of methods for energy-optimal gait generation for biped robots  
*Int. Conf. on Informatics and Control*, St. Petersburg, Russia, June 1997.

36. E. Cordier, **A. Goswami**, and M. Bourlier  
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38. B. Thuilot, A. Goswami, and B. Espiau  
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41. A. Goswami, J. T. Lea, A. Quaid, M. A. Peshkin, T. C. Kienzle III, and S. D. Stulberg  
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42. B. Espiau and A. Goswami  
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*IFAC Symp. on Robot Control (SyRoCo)*, Capri, Italy, September 1994.  
Google Scholar citation: 33

43. M. A. Peshkin, A. Goswami, and J. M. Schimmel  
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*31st Annual Allerton Conf. on Communication, Control, and Computing*, Urbana-Champaign, IL, October 1993.

44. A. Goswami and M. A. Peshkin  
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45. A. Goswami and M. A. Peshkin  
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46. A. Goswami, A. Quaid, and M. A. Peshkin  
Complete parameter identification of a robot using partial pose information (20)  
*IEEE Int. Conf. on Robotics and Automation*, Atlanta, GA, April 1993.  
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47. A. Goswami, A. Quaid, and M. A. Peshkin  
Calibration and parameter identification of a 6-DOF robot using a ball-bar system  
*IEEE Int. Conf. on Systems, Man, and Cybernetics (invited session)*, Chicago, IL, September 1992.

48. A. Goswami and M. A. Peshkin  
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49. A. Goswami and M. A. Peshkin  
A task-space formulation of passive force control  
50. **A. Goswami**, M. A. Peshkin, and J. E. Colgate
Passive robotics: An exploration of mechanical computation
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Google Scholar citation: 71

51. **A. Goswami** and J. R. Bosnik
Interpretation of redundant kinematic parameters in robotic manipulator calibration algorithms
Patents Issued

1. Machine Learning Approach for Predicting Humanoid Robot Fall
   Ambarish Goswami and Shivaram Kalyanakrishnan
   US Patent No. 8,554,370, Issued October 8, 2013

2. Humanoid Fall Direction Change Among Multiple Objects
   Ambarish Goswami, Yoshiaki Sakagami and Umashankar Nagarajan
   US Patent No. 8,369,991, Issued February 5, 2013

3. Inertia shaping for humanoid fall direction change
   Ambarish Goswami, Seung-kook Yun, Kangkang Yin, Yoshiaki Sakagami

4. Intelligent stepping for humanoid fall direction change
   Ambarish Goswami, Seung-kook Yun, Yoshiaki Sakagami
   US Patent No. 8,332,068, Issued December 11, 2012

5. Learning capture points for humanoid push recovery
   Jerry Pratt, Ambarish Goswami, John Rebula, Fabian Canas

6. Systems and Methods for Controlling a Legged Robot Based on Rate of Change of Angular Momentum
   Ambarish Goswami and Vinutha Kallem
   US Patent No. 78,060,253, Issued November 15, 2011

7. Determination of Foot Placement for Humanoid Push Recovery
   Jerry Pratt, Ambarish Goswami

8. Systems and methods for controlling a legged robot using a two-phase disturbance response strategy
   Ambarish Goswami and Muhammad E. Abdallah

9. Controller for an assistive exoskeleton based on active impedance
   Gabriel Aguirre-Ollinger, Ambarish Goswami, J. Edward Colgate, Michael A. Peshkin
   US Patent No. 7,731,670, Issued June 8, 2010

10. Characterization and classification of pose in low dimension
    Ambarish Goswami
11. Kinematic quantification of gait asymmetry based on bilateral cyclograms
   Ambarish Goswami