FINAL PROGRAM

2005 International Conference on Advanced Robotics

July 18–20, 2005
Sheraton Seattle Hotel and Towers

Welcome to Seattle for ICAR 2005!

This year's Final Program includes 131 papers from 36 countries plus three Plenary lectures by distinguished speakers, Dr. Richard Satava, Prof. Sebastian Thrun, and Dr. Paul Schenker. In addition to the technical program, there are several social events and technical tours. Please see your program and registration packet for details. In particular, don't miss our conference banquet on Tuesday evening. Since we will all take a cruise to the banquet site (Kianna Lodge) it is important to be ready when busses leave the hotel at 5:00 pm.

There are many people and organizations to thank for making ICAR 2005 happen. I want to thank all of the people and institutions on the next page who did excellent jobs in service to the international robotics research community. Most played indispensible roles in the success of ICAR, but I would particularly like to thank our Corporate sponsors, Microsoft and Coroware, Boeing Company for in-kind support, our distinguished International Program Chairs: Professor George Bekey, Professor Paolo Fiorini, and Professor Yoshihiko Nakamura, our Local Arrangements chair Dr. Steven Venema, and our Conference Manager, Ms. Jan Kvamme of the University of Washington's Office of Engineering Professional Programs.

Finally, I would like to thank the many authors and reviewers who worked so hard on the research results you are about to enjoy.

Sincerely,

Blake Hannaford

Blake Hannaford
ICAR 2005 General Chair
University of Washington
Box 352500
Seattle, WA 98195-2500
U.S.A.

Enjoy the conference!

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[1]*technical co-sponsor*

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GENERAL INFORMATION

Conference Location
ICAR 2005 is being held at the Sheraton Seattle Hotel and Towers. Plenary and technical sessions, workshops, tutorials, breakfasts and refreshment breaks will take place on the 2nd floor meeting level of the hotel. The Sunday evening Welcome Reception will be held in the Cirrus Room, on the 35th floor of the hotel.

Registration Desk
2nd Floor Lobby (window area)
Conference staff and student volunteers will be available to answer questions you may have throughout the conference.

Name Badges
Your name badge is required for admission to all sessions, breakfasts and other conference activities. Please wear it at all times.

Breakfasts
Grand C, 7:00 a.m.
Full continental breakfasts will be available for ICAR conference registrants before the Plenary Session on Monday, Tuesday and Wednesday in Grand C. Morning coffee breaks will also be in Grand C.

Messages
A message board will be located near the Registration Desk.

Concurrent Sessions
Presentation times for each session are listed in the program detail. The program is subject to change; please watch the message board for late program updates.

Speaker Preparation Room
Juniper Room, 2nd floor
A quiet room with tables and areas to plug in laptops to prepare is available to presenters. This room will be open during regular conference hours.

Conference Proceedings
ICAR 2005 Proceedings in CD-ROM format have been published and were included with your other registration materials in your conference bag. Additional copies may be available for purchase during the conference. Please inquire at the Registration Desk.

Welcome Reception

Sunday, 6:00–8:00p.m.
Cirrus Room, 35th Floor, Sheraton
You are invited to join your friends and colleagues at the ICAR 2005 Welcome Reception. The Sunday evening Welcome Reception will be held in the Cirrus Room, on the 35th floor of the hotel.

University of Washington Lab Tours

Monday, 5:30–8:00p.m.
University of Washington campus
Laboratory tours have been arranged for Monday evening. Space is limited and sign-up is required. Please refer to the insert included in your registration materials for additional information..

Boeing Airplane Assembly Plant Tour

Wednesday, 6:00–8:30p.m.
A special tour of the Boeing Airplane Assembly Plant in Everett has been arranged for Wednesday evening. Space is limited; tickets may be purchased for $10 at the Registration Desk. .

Conference Banquet

Puget Sound Cruise
Dinner at Kiana Lodge
Tuesday, July 19

4:50pm	Gather in 2nd Floor Sheraton lobby to meet shuttle busses on Union Street.
5:00pm	Shuttle bus to waterfront
5:30pm	Argosy boat departs for lodge
7:00pm	Banquet at Kiana Lodge
9:00pm	Return cruise to Seattle
10:30pm	Arrive waterfront for return shuttle to hotel

The ICAR 2005 conference banquet will be held at Kiana Lodge, a beautiful facility located on the Olympic Peninsula. After the 1.5 hour cruise through Puget Sound, guests will be welcomed onto the shore and may tour the lovely grounds. Dinner will feature alder-smoked salmon in the lodge's Garden Atrium. The return cruise will highlight Seattle's night-time skyline.

Your ticket for this special event was included with your registration materials. A limited number of guest tickets will be available for purchase through Monday at the Registration Desk.

Plenary Speakers

Monday Plenary

8:00 am West Room

"A Future Scenario for Robotics in Healthcare"

Richard Satava M.D., University of Washington

Prof. Richard Satava, MD FACS, is a Professor of Surgery at the University of Washington Medical Center and a Special Assistant in Advanced Technologies at the US Army Medical Research and Materiel Command in Ft. Detrick, MD. Prior to this he was a Professor of Surgery at Yale University, and had a military appointment as a Professor of Surgery (USUHS) in the Army Medical Corps assigned to General Surgery at Walter Reed Army Medical Center.

His undergraduate training was at Johns Hopkins University, medical school at Hahnemann University of Philadelphia, internship at the Cleveland Clinic, surgical residency at the Mayo Clinic and a fellowship with a Master of Surgical Research at Mayo Clinic.

He has served on the White House Office of Science and Technology Policy (OSTP) committee on Health, Food and Safety, and was a program manager at the Defense Advanced Research Projects Agency (DARPA). He is currently a member of the Emerging Technologies, Resident Education, and Regents Committee on Informatics committees of the American College of Surgeons (ACS), has been the past President of the Society of American Gastrointestinal Endoscopic Surgeons (SAGES), president elect of the Society of Laparoendoscopic Surgeons (SLS) and is on the Board of Governors of a number of surgical societies, editorial board of numerous surgical and scientific journals, and active in numerous surgical and engineering societies.

He has been continuously active in surgical education and surgical research with over 150 publications and book chapters in diverse areas of advanced surgical technology to include Surgery in the Space Environment, Video and 3-D imaging, Telepresence Surgery, and Virtual Reality Surgical Simulation.

During 20 years of military surgery he has been an active flight surgeon, an Army astronaut candidate, MASH surgeon for the Grenada Invasion, and a hospital commander during Desert Storm, all the while continuing clinical surgical practice. While striving to practice the complete discipline of surgery, he is aggressively pursuing the leading edge of advanced technologies to formulate the architecture for the next generation of Medicine.

Tuesday Plenary

8:00 am West Room

"175 Miles Through The Desert: Perspectives on the DARPA Grand Challenge"

Professor Sebastian Thrun, Stanford University

Professor Sebastian Thrun is the Director of the Stanford AI Lab, home to more than 120 researchers at Stanford University, California. He recently changed to Stanford from Carnegie Mellon University, where he was an associate professor and held an endowed chair. Thrun has pioneered the area of probabilistic robotics, but also pursues research on machine learning, AI, and multi-agent systems. Thrun has won several best paper awards (AAAI-98, DAGM-98, ICRA-00, AAMAS-03, FSR-03, ICRA-03), and is a frequent keynote speaker at international conferences in AI and robotics (IROS-04, AAAI-04, ICML-02, UAI-02, ECAI-02, NIPS-01, BNAIC-01, IJCAI-01, FSR-01), and he is the recipient of the 2001 Olympus Award. He has published over 250 papers, including seven books and edited volumes, and he serves on the editorial board of a number of journals in robotics and AI. Thrun was general chairperson of the 2003 NIPS conference and the 1998 CONALD conference, and will be the general chair of the new Robotics 2005 conference.

Wednesday Plenary

8:00 am West Room

"Mars Exploration and Beyond: New Venues for Space Robotics"

Dr. Paul S. Schenker, Jet Propulsion Laboratory

Dr. Paul S. Schenker is Manager, Robotics Space Exploration Technologies Program, at the Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California. His responsibilities encompass the strategic development of technical capabilities for future NASA robotic and human-robotic missions. His prior assignments at JPL include manager of JPL's mobility/robotics line organization of about 100 people, and supervisor of two related robotics groups. His research has included topics in robotic perception, robot control architectures, telerobotics and teleoperation, multi-sensor fusion, and most recently, multi-robot cooperation, areas to which he has contributed about 140 peer review publications as well as a number of recent keynote and plenary technical conference presentations. He has led the development of robotic systems that include the Field Integrated Design & Operations Rover (FIDO), Planetary Dexterous Manipulator (MarsArm, microArm), Robot Assisted Microsurgery System (RAMS), Robotic Work Crew (RWC), and All Terrain Explorer (ATE/Cliff-bot), with resulting technology contributions to NASA missions including the currently operative Mars Exploration Rovers (MER). Dr. Schenker is active in the AAAI, IEEE, OSA, and SPIE. He has served as an elected Board member and 1999 President of the last; he currently serves as an elected member of the National Academy of Sciences/United States Advisory Committee to the International Commission for Optics.

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Dept de Control Automático, Cinvestav

Schedle-at-a-Glance
Monday, July 18, 2005

7:00am — **Registration Desk Opens**
2nd Floor Lobby - windows area

7:00am — **Continental Breakfast**
Grand C

8:00-8:45am — **Opening Plenary Session**
West Ballroom

"A Future Scenario for Robotics in Healthcare"
Richard Satava M.D., University of Washington

9:00-10:20am — **Concurrent Sessions 1**

West A	*West B*	*East Ballroom*
A1. Motion Planning and Localization I	B1. Space and Underwater Robotics	C1. Control I

10:20am — **Refreshment Break** — *Grand C*

10:40-Noon — **Concurrent Sessions 2**

West A	*West B*	*East Ballroom*
A2. Motion Planning and Localization II	B2. Manipulation and Grasping I	C2. Control II

Noon-13:30 — **Lunch** *(on your own)*

13:30–14:50 — **Concurrent Sessions 3**

West A	*West B*	*East Ballroom*
A3. Motion Planning and Localization III	B3. Manipulation and Grasping II	C3. Legged Locomotion

14:50–15:10 — **Refreshment Break** — *2nd Floor Lobby*

15:10–16:30 — **Concurrent Sessions 4**

West A	*West B*	*East Ballroom*
A4. Localization and Slam	B4. Mobile Manipulation	C4. Flying Robots

17:30–20:00 — **University of Washington Lab Tours**
Sign-up required.

Schedle-at-a-Glance
Tuesday, July 19, 2005

7:00am — **Continental Breakfast**
Grand C

7:30am — **Registration Desk Opens**
2nd Floor Lobby - windows area

8:00-8:45am — **Plenary II**
West Ballroom

"175 Miles Through The Desert: Perspectives on the DARPA Grand Challenge"
Professor Sebastian Thrun, Stanford University

9:00-10:20am — **Concurrent Sessions 5**

West A	*West B*	*East Ballroom*
A5. Learning I	**B5. Medical Robotics**	**C5. Computer and Robot Vision I**

10:20am — **Refreshment Break** *Grand C*

10:40-Noon — **Concurrent Sessions 6**

West A	*West B*	*East Ballroom*
A6. Learning II	**B6. Surgical Robotics**	**C6. Computer and Robot Vision II**

Noon-13:30 — **Lunch** *(on your own)*

13:30-14:50 — **Concurrent Sessions 7**

West A	*West B*	*East Ballroom*
A7. Mobile Robots I	**B7. Rehabilitation Robotics**	**C7. Computer and Robot Vision III**

14:50–15:10 — **Refreshment Break** *2nd Floor Lobby*

15:10–16:30 — **Concurrent Sessions 8**

West A	*West B*	*East Ballroom*
A8. Mobile Robots II	**B8. Biologically Inspired Systems**	**C8. Computer and Robot Vision IV**

Evening — **ICAR 2005 Banquet**

16:50	*Gather in 2nd Floor Lobby*
17:00	*Shuttle bus to Argosy boat on Pier 56*
17:30	*Boat departs Seattle waterfront / Puget Sound Cruise*
19:00	*Banquet Dinner at Kiana Lodge*
22:30	*Arrive back at waterfront / shuttle return to hotel*

Schedle-at-a-Glance
Wednesday, July 20, 2005

7:00am — **Continental Breakfast**
Grand C

7:30am — **Registration Desk Opens**
2nd Floor Lobby - windows area

8:00-8:45am — **Plenary III**
West Ballroom

"Mars Exploration and Beyond: New Venues for Space Robotics"
Dr. Paul S. Schenker, Jet Propulsion Laboratory

9:00-10:20am — **Concurrent Sessions 9**

West A	*West B*	*East Ballroom*
A9. Navigation	B9. Sensing I	C9. Humanoids

10:20am — **Refreshment Break** *Grand C*

10:40-Noon — **Concurrent Sessions 10**

West A	*West B*	*East Ballroom*
A10. Human Robot Interaction	B10. Sensing II	C10. Telerobotics I

Noon-13:30 — **Lunch** *(on your own)*

13:30-14:50 — **Concurrent Sessions 11**

West A	*West B*	*East Ballroom*
A11. Multiple Robot Systems I	B11. Actuators for Hopping	C11. Telerobotics II

14:50–15:10 — **Refreshment Break** *2nd Floor Lobby*

15:10–16:30 — **Session 12**

West Room
A12. Multiple Robot Systems II

18:00–20:30 — **Boeing Everett Assembly Plant Tour**
Limited space. Ticket Required.

Detailed Presentation Schedule

ON FOLLOWING PAGES

Sunday, July 17, 2005

8:00 **Tutorial Check-In**
Aspen Room, 2nd Floor Sheraton

8:30–12:30 Tutorial 2

Room: Cedar Room, 2nd Floor Sheraton

Design of Remotely Operated Vehicle & Manipulator: Critical Issues & Realization

Dr. Debanik Roy, Division of Remote Handling & Robotics, Bhabha Atomic Research Centre, Mumbai, India

8:30–18:00 Tutorial 4

Room: Douglas Room, 2nd Floor Sheraton

Robotics and Neuroscience

Angel P. del Pobil, Robotic Intelligence Laboratory, Universitat Jaume-I, Campus Riu Sec, Edificio TI, E-12071 Castellon , Spain

13:00 **Workshop Check-In**
Aspen Room, 2nd Floor Sheraton

14:00–18:00 Workshop 1

Room: Cedar Room, 2nd Floor Sheraton

Navigation and Manipulation for Mars Rovers

Won Kim – Jet Propulsion Laboratory

16:00-17:30 **Conference Check-In**
Aspen Room, 2nd Floor Sheraton

EVENING
ICAR 2005 Welcome Reception

Cirrus Room, 35th Floor Sheraton
18:00–20:00

7:00 **Registration Desk Opens**
2nd Floor Lobby

7:00–8:00 **Continental Breakfast**
Grand C

8:00–8:50 **Opening Plenary Session**
West Ballroom

Welcome
Blake Hannaford, ICAR 2005 Conference Chair

Plenary Talk
Professor Richard Satava M.D., University of Washington
"A Future Scenario for Robotics in Healthcare"

9:00–10:20 CONCURRENT SESSIONS 1

A1. Motion Planning and Localization I
Chair: Tsong-Li Lee
Room: West A

9:00 **Real-Time Generation of Fast, Torque-Efficient Motions**
Frank Chongwoo Park, Jinhyeok Choi, Soonkyum Kim KOREA

9:20 **Optimal Trajectory Planning of Manipulators Subject to Motion Constraints**
Yueshi Shen, Knut Hueper AUSTRALIA

9:40 **Mobile Robot Localization based on Consecutive Range Sensor Scanning and Optical Flow Measurements**
Lee Sooyong, Sungjin Baek, Hyunwoong Park KOREA

10:00 **A Reactive Planner for Mobile Robots with Generic Shapes and Kinematics on Variable Terrains**
Fabio Marchese ITALY

B1. Space and Underwater Robotics
Chair: Antal K. Bejczy
Room: West B

9:00 **Robotics and Autonomous Technology for Asteroid Sample Return Mission**
Takashi Kubota JAPAN

9:20 **Simulation Study of Fish Swimming Modes for Aquatic Robot System**
EunJung Kim, Youm Youngil KOREA(R.O.K)

9:40 **Manipulator Robotics in Use for Decommissioning of A-1 Nuclear Power Plant**
Stanislav Capuska SLOVAK REPUBLIC

10:00 **3D-Bottom Tracking based on Acoustic Diffraction for Autonomous Underwater Vehicles**
Vincent Creuze, Bruno Jouvencel, Philippe Baccou FRANCE

C1. Control I
Chair: Takahiro Suzuki
Room: East Room

9:00 **Predictive Fuzzy Control For A Mobile Robot With Nonholonomic Constraints**
Xianhua Jiang USA

9:20 **Dynamic Analysis of Casting and Winding with Hyper-Flexible Manipulator**
Takahiro Suzuki, Yuji Ebihara, Ken Shintani JAPAN

9:40 **FPGA Implementation of Closed-Loop Control System for Small-Scale Robot**
Wei Zhao, Byung Hwa Kim, Amy C. Larson, Richard M. Voyles USA

10:00 **Optimal Control Strategy for Hybrid Automata**
Debora Botturi, Paolo Fiorini, Andrea Castellani ITALY

10:20–10:40 **Coffee Break**
Grand C

10:40—NOON CONCURRENT SESSIONS 2

A2. Motion Planning and Localization II
Chair: Paolo Fiorini
Room: West A

10:40 **Sensor-Based Robot Path Planning Using Harmonic Function-based Probabilistic Roadmaps**
Moslem Kazemi, Mehran Mehrandezh, Kamal Gupta CANADA

11:00 **A New Algorithm for Construction of Discretized Configuration Space Obstacle and Collision Detection of Manipulators**
Xiaojun Wu, Qing Li, Kok Hui Heng SINGAPORE

11:20 **A Real-time Optimized Path Planning for a Fixed Wing Vehicle Flying in a Dynamic and Uncertain Environment**
Zhihua Qu, Jian Yang USA

11:40 **Path Planning Using Flat Potential Field Approach**
Paolo Fiorini, Claudio Cosma, Lorenzo Benamati ITALY

B2. Manipulation and Grasping I
Chair: Paul Y. Oh
Room: West B

10:40 **Experimental Analysis of Soft Fingertips with Internal Rigid Core**
Paolo Tiezzi, Gabriele Vassura ITALY

11:00 **Manipulation of deformable linear objects: Force-based simulation approach for haptic feedback**
Björn Kahl GERMANY

11:20 **Natural Resolution of DOF Redundancy in Execution of Robot Tasks under the Gravity: A Challenge to Bernstein's Problem and Applications to Handwriting Robots**
Hiroe Hashiguchi, Suguru Arimoto, Masahiro Sekimoto JAPAN

11:40 **Dynamic Intercept and Manipulation of Objects Using a Novel Pneumatic Robot Hand**
Yanfei Liu, Adam Hoover, Ian Walker USA

C2. Control II
Chair: Linda Bushnell
Room: East Ballroom

10:40 **Feedback Control Design of Differential-Drive Wheeled Mobile Robots**
Shouling He USA

11:00 **On a Dynamic Reconfigurable Multi-Sensoric Supervisory Control Concept for Human Interactive Robots**
Giulio Milighetti, Helge-Björn Kuntze, Christian Frey GERMANY

11:20 **Vision-Based Tracking Control for Mobile Robots**
Ricardo Carelli ARGENTINA

11:40 **Oscillator-based Yoyo Control: Implementation and Comparison with Model-based Control**
Hui-Liang Jin PRC

Noon–13:30 **Lunch (on your own)**

13:30–14:50 CONCURRENT SESSIONS 3

A3. Motion Planning and Localization III
Chair: Paolo Fiorini
Room: West A

13:30 **Tool Path Integration for Spray Forming Processes using a Genetic Algorithm**
Weihua Sheng USA

13:50 **Visual and Laser Sensory Data Fusion for Outdoor Robot Localisation and Navigation**
Stefano Pagnottelli, Sergio Taraglio, Paolo Valigi, Andrea Zanela ITALY

14:10 **Kalman Filters Comparison for Vehicle Localization Data Alignment**
Benjamin Mourllion, Dominique Gruyer, Alain Lambert, Sébastien Glaser FRANCE

Monday, July 18, 2005

B3. Manipulation and Grasping II

Chair: Ian Walker
Room: West B

13:30 **Singularity-Free Fully-Isotropic Parallel Manipulators with Schonflies Motions**
Grigore Gogu FRANCE

13:50 **3D Grasping Solutions Through MWS Models**
Andres Salomon Vazquez, Antonio Adan, Fernando Molina SPAIN

14:10 **Workspace Analysis of Parallel Mechanism with Adjustable Link Parameters**
Wataru Tanaka, Tatsuo Arai, Kenji Inoue, Tomohito Takubo, Yasushi Mae, Yoshihiko Koseki JAPAN

14:30 **Dielectrophoretic Micro/Nanoassembly with Microtweezers and Nanoelectrodes**
Arunkumar Subramanian, Barmeshwar Vikramaditya, Bradley J. Nelson, Dominik Bell, Lixin Dong SWITZERLAND

C3. Legged Locomotion

Chair: Satoshi Ito
Room: East Ballroom

13:30 **Gait Production in a Tensegrity Based Mobile Robot**
Chandana Paul USA

13:50 **Rotational Legged Locomotion**
Damian Lyons, Kiran Pamnany USA

14:10 **Exploiting Body Dynamics for Controlling a Running Quadruped Robot**
Fumiya Iida, Gabriel J. Gómez, Rolf Pfeifer SWITZERLAND

14:30 **Stability Analysis of Passive-Dynamic-Walking focusing on the Inner Structure of Poincare Map**
Yasuhiro Sugimoto, Koichi Osuka JAPAN

14:50–15:10 **Break** *2nd Floor Lobby (Window Area)*

15:10–16:30 Concurrent Sessions 4

A4. Localization and Slam

Chair: George Bekey
Room:West A

15:10 **6D SLAM with Approximate Data Associoation**
Andreas Nuechter GERMANY

15:30 **A Nonlinear Programming Method for 3D Localization of Mobile Robots**
Tsong-Li Lee TAIWAN

15:50 **Online SLAM in Dynamic Environments**
G.Q. Huang HONG KONG

16:10 **Self-Localization Through Color Features Detection**
Antonio Sgorbissa, Mattia Castelnovi, Renato Zaccaria Italy

B4. Mobile Manipulation

Chair: Marcelo Ang
Room: West B

15:10 **Constrained Path Planning and Task-Consistent Path Adaptation for Mobile Manipulators**
Daniel Aarno, Frank Lingelbach, Danica Kragic SWEDEN

15:30 **Kinematic Analysis for Task-Based Reconfiguration of Wheel-Arm Robots**
Thavida Maneewarn, Somkid Suthaweesub THAILAND

15:50 **RoboTalk: Controlling Arms, Bases and Androids through a Single Motion Interface**
Allen Yang, Hector Gonzalez-Banos, Victor Ng-Thow-Hing, James Davis USA

C4. Flying Robots

Chair: Takashi Kubota
Room: East Ballroom

15:10 **Visual control of an unmanned aerial vehicle for power line inspection**
Ian Golightly, Dewi Jones UNITED KINGDOM

15:30 **Robotic Rotorcraft and Perch-and-Stare: Sensing Landing**
Todd Danko, Andreas Kellas, Paul Oh USA

15:50 **Designing an Aerial Robot for Hover-and-Stare Surveillance**
Paul Oh USA

16:10 **A Competition to Identify Key Challenges for Unmanned Aerial Robots in Near-Earth Environments**
William Green, Keith Sevcik, Paul Oh USA

EVENING

University of Washington Lab Tours

Sign-up required / space is limited. See message board for details.

17:30 **Shuttle departs for campus.**

18:00 **Lab tours**

20:00 **Return to hotel.**

Tuesday, July 19, 2005

7:00–8:00 **Continental Breakfast**
Grand C

7:30 **Registration Desk Opens**
2nd Floor Lobby

8:00–8:50 **Plenary II**
West Ballroom

Introductory Remarks
Blake Hannaford, ICAR 2005 Conference Chair

Plenary Talk
Prof. Sebastian Thrun, Stanford University
"175 Miles Through The Desert: Perspectives on the DARPA Grand Challenge"

9:00–10:20 Concurrent Sessions 5

A5. Learning I
Chair: Steven C. Venema
Room: West A

9:00 **Continuous Area Sweeping: A Task Definition and Initial Approach**
Mazda Ahmadi USA

9:20 **Emergence of Coherent Behaviors from Homogenous Sensorimotor Coupling**
Simon Bovet, Rolf Pfeifer SWITZERLAND

9:40 **Integrating Object and Grasp Recognition for Dynamic Scene Interpretation**
Staffan Ekvall, Danica Kragic SWEDEN

10:00 **Probabilistic Model of Whole-body Motion Imitation from Partial Observations**
Dongheui Lee, Yoshihiko Nakamura JAPAN

B5. Medical Robotics
Chair: Jaydev Desai
Room: West B

9:00 **Kinematic Analysis and Dynamic Controlof a 3-PUU Parallel Manipulator for Cardiopulmonary Resuscitation**
Yangmin Li, Qingsong Xu MACAO SAR

9:20 **Intestinal locomotion by means of mucoadhesive films**
Peter A. Wieringa THE NETHERLANDS

9:40 **3D and 2D Finite Element Analysis in Soft Tissue Cutting for Haptic Display**
Jaydev Desai USA

10:00 **Design of an Artificial Muscle Actuated Finger towards Biomimetic Prosthetic Hands**
Edward J. Park CANADA

C5. Computer and Robot Vision I

Chair: Jacob Rosen
Room: East Ballroom

9:00 **Wide-Baseline Stereo Experiments in Natural Terrain**
Clark Olson, Habib Abi-Rached USA

9:20 **Rover Mast Calibration, Exact Camera Pointing, and Camera Handoff for Visual Target Tracking**
Won Kim, Adnan Ansar, Robert Steele USA

9:40 **Reliable Solution for Object Pose Determination using an Active Vision System**
Yan Meng, Hanqi Zhuang USA

10:00 **Identifying and Segmenting Human-Motion for Mobile Robot Navigation using Alignment Errors**
Wael Abd-Almageed USA

10:20–10:40 **Coffee Break** *Grand C*

10:40—NOON CONCURRENT SESSIONS 6

A6. Learning II

Chair: Richard Voyles
Room: West A

10:40 **Goal-directed Imitation with Self-adjusting Adaptor Based on a Neural Oscillator Network**
Yang Woosung JAPAN

11:00 **Unsupervised Probabilistic Segmentation of Motion Data for Mimesis Modeling**
Bastien Janus JAPAN

11:20 **Robot Experiment of Torque Learning for Biped Balance with respect to Periodic External Force**
Satoshi Ito, Kohei Moriki, Haruhisa Kawasaki, Minoru Sasaki JAPAN

11:40 **Key Feature Extraction for Probabilistic Categorization of Human Motion Patterns**
Wataru Takano JAPAN

Tuesday, July 19, 2005

B6. Surgical Robotics

Chair: Edward J. Park
Room: West B

10:40 **Control Algorithms for Active Relative Motion Cancelling for Robotic Assisted Off-Pump Coronary Artery Bypass Graft Surgery**
M. Cenk Cavusoglu, Jason Rotella, Wyatt S. Newman, Sangeun Choi, Jeff Ustin, S. Shankar Sastry USA

11:00 **On Integration of a Novel Minimally Invasive Surgery Robotic System**
Jeff Kuang-chen Hsu, Temei Li, Shahram Payandeh CANADA

11:20 **Direct and Inverse Problem Models for Large Soft-Tissue Deformation: Application to Haptic Feedback in Surgical Simulation**
Jaydev Desai USA

11:40 **Suturing in Confined Spaces: Constrained Motion Control of a Hybrid 8-DoF Robot**
Ankur Kapoor, Nabil Simaan, Russell H. Taylor USA

C6. Computer and Robot Vision II

Chair: Clark Olson
Room: East Ballroom

10:40 **Towards AGV Safety and Navigation Advancement - Obstacle Detection using a TOF Range Camera**
Roger Bostelman USA

11:00 **Attention Shifts During Action Sequence Recognition For Social Robots**
Bassam Khadhouri, Yiannis Demiris UK

11:20 **Visual Imput Compensation using the Crowley-Arbib Saccade Model**
Fortunato Flores Ando, Alfredo Weitzenfeld Ridel MEXICO

11:40 **Visibility-based Exploration in Unknown Environment**
Tirthankar Bandyopadhyay SINGAPORE

Noon–13:30 **Lunch** *(on your own)*

13:30–14:50 Concurrent Sessions 7

A7. Mobile Robots I

Chair: Carlo Innocenti
Room: West A

13:30 **A case study of mobile robot's energy consumption and conservation techniques**
Yongguo mei, Yung-Hsiang Lu, Y. Charlie Hu, C. S. George Lee USA

13:50 **The Development of the Mobile Inspection Robot for Rescue Activity, MOIRA2**
Rintaro Haraguchi, Koichi Osuka, Shinobu Makita, Satoshi Tadokoro JAPAN

14:10 **Applying Robot-in-the-Loop-Simulation to Mobile Robot Systems**
Xiaolin Hu USA

14:30 **Cable Maintenance Robot and its Dynamic Response Moving on the Horizontal Cable**
Jun Luo P. R. CHINA

B7. Rehabilitation Robotics

Chair: Yoshihiko Nakamura
Room: West B

13:30 **Passive Omnidirectional Walker -Design and Control-**
Naemeh Nejatbakhsh, Yasuhisa Hirata, Kazuhiro Kosuge JAPAN

13:50 **Design of an Arm Exoskeleton with Scapula Motion for Shoulder Rehabilitation**
Craig Carignan, Michael Liszka, Stephen Roderick USA

14:10 **The Human Arm Kinematics and Dynamics During Daily Activities - Toward a 7 DOF Upper Limb Powered Exoskeleton**
Jacob Rosen USA

14:30 **Modeling and Implementation of McKibben Actuators for a Hopping Robot**
Nathan Delson, Thomas Hanak, Kevin Loewke, Dan Miller USA

C7. Computer and Robot Vision III

Chair: Wael Abd-Almageed
Room: East Ballroom

13:30 **Visual Tracking Control of a Mobile Robot Using a New Model in Image Plane**
Kai-Tai Song, Chi-Yi Tsai TAIWAN, ROC

13:50 **High-speed search for similar image from database for dexterous robot hand control**
Kiyoshi Hoshino JAPAN

14:10 **Visual Detection and Tracking of Poorly Structured Dirt Roads**
David Fernandez AUSTRALIA

14:30 **Properties of the Affinity Matrix for Multiple Closed Contour Segmentation**
Kanglin Xu, George Luger USA

14:50–15:10 **Break**
2nd Floor Lobby (Window Area)

15:10–16:30 Concurrent Sessions 8

A8. Mobile Robots II

Chair: Akihisa Ohya
Room: West A

15:10 **Torque Distribution and Slip Minimization in an Omnidirectional Mobile Base**
Yuan Ping Li, Denny Oetomo, Marcelo H. Ang Jr., Chee Wang Lim CHINA

15:30 **An Omnidirectional Vehicle on a Basketball**
Tatsuro Endo JAPAN

15:50 **Development of Robotic Wall System to Protect Victims**
Hisanori Amano, Koichi Osuka, Yuki Iwano JAPAN

16:10 **Positioning the Base of Spatial 2-dof Regional Manipulators in Order to Reach as Many Arbitrarily-Chosen Points in Space as Possible**
Carlo Innocenti ITALY

B8. Biologically Inspired Systems

Chair: Craig Carignam
Room: West B

15:10 **Force Measurements on a Scaled Mechanical Model of the Dragonfly in Forward Flight**
Winson Lai, Joseph Yan, Mehran Motamed, Sheldon Green CANADA

15:30 **SpinybotII: Climbing Hard Walls with Compliant Microspines**
Sangbae Kim, Alan T. Asbeck, Mark R. Cutkosky, William R. Provancher USA

15:50 **Bio-Inspired Neural Model for Sensory-Motor Coordination of a Neuro-Robotic Manipulation Platform**
Gioel Asuni ITALY

C8. Computer and Robot Vision IV

Chair: Yang Meag
Room: East Ballroom

15:10 **Object and Pose Recognition Using Contour and Shape Information**
Hugo Cornelius, Danica Kragic, Jan-Olof Eklundh SWEDEN

15:30 **DynaTracker: Target Tracking in Active Video Surveillance Systems**
Prithwijit Guha, Dibyendu Palai, Dip Goswami, Amitabha Mukerjee INDIA

15:50 **Omnidirectional Stereovision System for Occupancy Grids**
Fabiano Correa, Jun Okamoto Jr BRAZIL

16:10 **Camera Calibration and Measurements Using Circular Grooves inside Pipes**
Kyungmin Jeong SOUTH KOREA

EVENING

ICAR 2005 Banquet

Cruise to Kiana Lodge aboard the Argosy boat, the Goodtime II. Salmon dinner at the lodge. Remember your ticket and name badge.

16:50 **Gather in the 2nd floor Sheraton lobby to meet shuttle busses.**

17:00 **Shuttle to Argosy dock, Pier 56 on the Seattle waterfront.**

17:30 **Puget Sound cruise on the Goodtime II.**

19:00 **Arrive at Kiana Lodge for banquet.**

21:00 **Return cruise to Seattle.**

22:30 **Shuttle bus to hotel.**

Wednesday, July 20, 2005

7:00–8:00 **Breakfast**
Grand C

7:30 **Registration Desk Opens**
2nd Floor Lobby

8:00–8:50 **Plenary III**
West Ballroom

Introductory Remarks
Blake Hannaford, ICAR 2005 Conference Chair

Plenary Talk
Dr. Paul S. Schenker, Jet Propulsion Laboratory
California Institute of Technology, Pasadena, California
"Mars Exploration and Beyond: New Venues for Space Robotics"

9:00–10:20 Concurrent Sessions 9

A9. Navigation
Chair: Antonio Sgorbissa
Room: West A

9:00 **A Simple Navigation Algorithm with no Local Minima**
Joao Paulo Graciano NETHERLANDS

9:20 **Visual Navigation of Wheeled Robots: Compensating Floor Undulations**
Vivek Singh, Adnan Bohori, Amitabha Mukerjee, K. S. Venkatesh INDIA

9:40 **A Novel Obstacle Avoidance and Navigation Method of Outdoor Mobile Robot**
Yunchong Li CHINA

10:00 **Nonlinear Coordinated Path Following Control of Multiple Wheeled Robots with Communication Constraints**
Reza Ghabcheloo, Antonio Pascoal, Carlos Silvestre PORTUGAL

B9. Sensing I
Chair: Zack Bulter
Room: West B

9:00 **Accurate Object Localization in 3D Laser Range Scans**
Andreas Nuechter GERMANY

9:20 **Autonomous Robotic Monitoring of Underground Cable Systems**
Bing Jiang, Alanson Sample, Ryan Wistort, Alexander Mamishev USA

9:40 **LVQ Neural Network Based Target Differentiation Method for Mobile Robot**
Xin Ma CHINA

10:00 **Continuous Identification of Gait Phase for Robotics and Rehabilitation Using Microsensors**
Rodolphe Heliot FRANCE

C9. Humanoids

Chair: Bernard Espiau
Room: East Ballroom

9:00 **Active-Passive Knee Control for the Humanoid UT-Theta**
Dirk Wollherr, Fabio Zonfrilli, Yoshihiko Nakamura GERMANY

9:20 **Walking Control of the Humanoid UT-Theta**
Fabio Zonfrilli ITALY

9:40 **Pinching with finger tips in humanoid robot hand**
Kiyoshi Hoshino JAPAN

10:00 **Modular Behavior Control for a Cognitive Robot**
Palis Ratanaswasd, Will Dodd, Kazuhiko Kawamura, David Noelle USA

10:20–10:40 **Coffee Break** Grand C

10:40—NOON CONCURRENT SESSIONS 10

A10. Human Robot Interaction

Chair: George Bekey
Room: West A

10:40 **Real-Time Safety for Human Robot Interaction**
Dana Kulic, Elizabeth Croft CANADA

11:00 **Supervision and Interaction : Analysis of an Autonomous Tour-guide Robot Deployment**
Aurelie Clodic, Sara Fleury, Rachid Alami, Raja Chatila, Matthieu Herrb FRANCE

11:20 **Trajectory Control for Groups of Humans by Deploying a Team of Mobile Robots**
Edgar Martinez-Garcia, Akihisa Ohya, Shinichi Yuta JAPAN

11:40 **Rational Aggressive Behaviour Reduces Interference In A Mobile Robot Team**
Sarah Brown, Mauricio Zuluaga, Yinan Zhang, Richard Vaughan CANADA

B10. Sensing II

Chair: Hideyuki Tsukagoshi
Room: West B

10:40 **Perception-Based Search and Manipulation in a Semi-Structured Environment**
Mario Prats, Pedro J. Sanz, Angel P. del Pobil SPAIN

11:00 **A Light Way of Integrating Texture**
Benjamin Le Mercier, Abderrahmane Kheddar FRANCE

11:20 **Integration of Force-Position Control and Haptic Interface facilities for a Virtual Excavator Simulator**
Hasan Ismael Torres Rodriguez, Vicente Parra Vega, Francisco . J Ruiz Sànchez MEXICO

11:40 **Motion-Constrained Mobile Sensor Networks**
Zack Butler USA

C10. Telerobotics I

Chair: Yasuharu Kunii
Room: East Ballroom

10:40 **Free Space Structurization of Telerobotic Environment for On-line Transition to Autonomous Tele-Manipulation**
Tsutomu Hasegawa JAPAN

11:00 **Stable and High Performance Teleoperation with Time Domain Passivity Control: Reference Energy Following Scheme**
Jee-Hwan Ryu, Jong-Hwan Kim R. OF KOREA

11:20 **An Approach to Modelling Collaborative Teleoperation**
Narjes Khezami FRANCE

11:40 **Time Delayed Teleoperation System Control, A Passivity-Based Method**
Yongjun Hou, Greg Luecke USA

Noon–13:30 **Lunch** (on your own)

13:30–14:50 CONCURRENT SESSIONS 11

A11. Multiple Robot Systems I

Chair: Sooyong Lee
Room: West A

13:30 **Recharging Robot Teams: A Tanker Approach**
Pawel Zebrowski, Richard Vaughan CANADA

13:50 **Minimizing Data Exchange in Ad Hoc Multi-robot Networks**
Weihua Sheng USA

14:10 **Coalescent Multi-Robot Teaming through ASyMTRe: A Formal Analysis**
Fang Tang, Lynne Parker USA

14:30 **Adaptive Distributed Fetching and Retrieval of Goods By a Swarm-Bot**
Giovanni Cosimo Pettinaro, Luca Maria Gambardella, Alejandro Ramirez-Serrano SWITZERLAND

B11. Actuators for Hopping

Chair: Koichi Osuka
Room: West B

13:30 **Jumping Robot for Rescue Operation with Excellent Traverse Ability**
Hideyuki Tsukagoshi JAPAN

13:50 **Control strategy for planar vertical jump**
Victor Nunez, Nelly Nadjar-Gauthier, Sergey Drakunov, Jean-Charles Cadiou FRANCE

14:10 **An Engineering Approach to Reduced Power Consumption of IPMC (Ion-Polymer Metal Composite) Actuators**
Maarja Kruusmaa ESTONIA

C11. Telerobotics II

Chair: Jee-Hwan Ryu
Room: East Ballroom

13:30 **Fault Detection of Tool/Load Grasping for Telerobotics Using Neural Networks**
Sewoong Kim, William Hamel USA

13:50 **Command Path Compensation Algorithm for Rover Tele-driving System and Its Evaluation**
Yasuharu Kunii, Makoto Moriyama, Shingo Nagatsuka, Yoshinori Ishimaru JAPAN

14:10 **Design and Development of a Multiple DOF Compliant Robot**
Michael C.S. Tam, Shahram Payandeh, M. Parameswaran CANADA

14:50–15:10 **Break**
2nd Floor Lobby (Window Area)

15:10–16:30 SESSION 12

A12. Multiple Robot Systems II

Chair: Tsutomu Hasegawa
Room: West A

15:10 **Cooperative Transport of Extended Payloads**
Gerard McKee UK

15:30 **An Overview of a Probabilistic Tracker for Multiple Cooperative Tracking Agents**
Roozbeh Mottaghi CANADA

15:50 **Exploration Algorithm for Multiple Robots**
Sooyong Lee, Jungyun Bae KOREA

16:10 **A framework for the development of cooperative robotic applications**
Patricio Nebot, Enric Cervera SPAIN

Wednesday, July 20, 2005

Evening

Boeing Everett Assembly Plant Tour

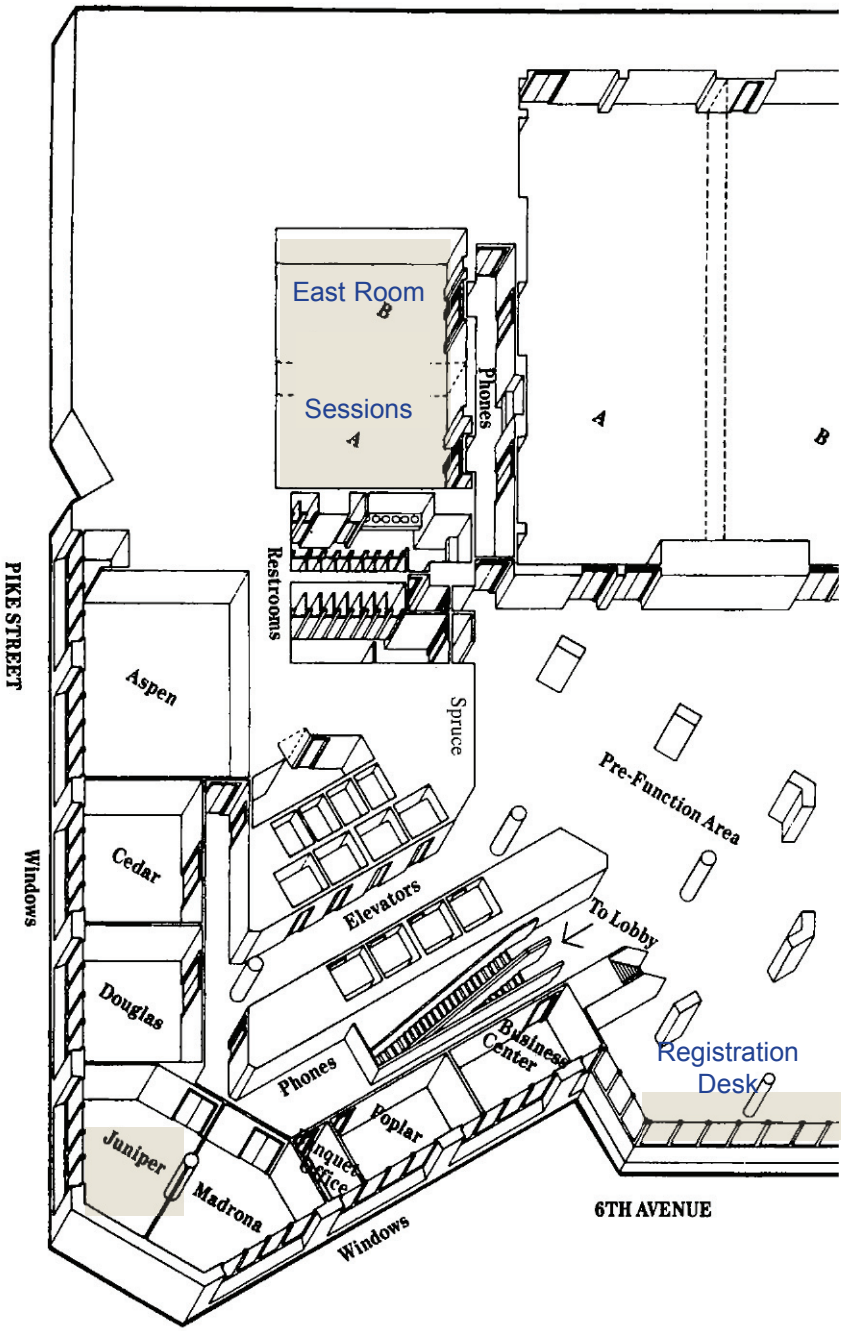
Limited to 30 ICAR participants / sign up required. Photo ID required at tour.

18:00 **Shuttle departs hotel.**

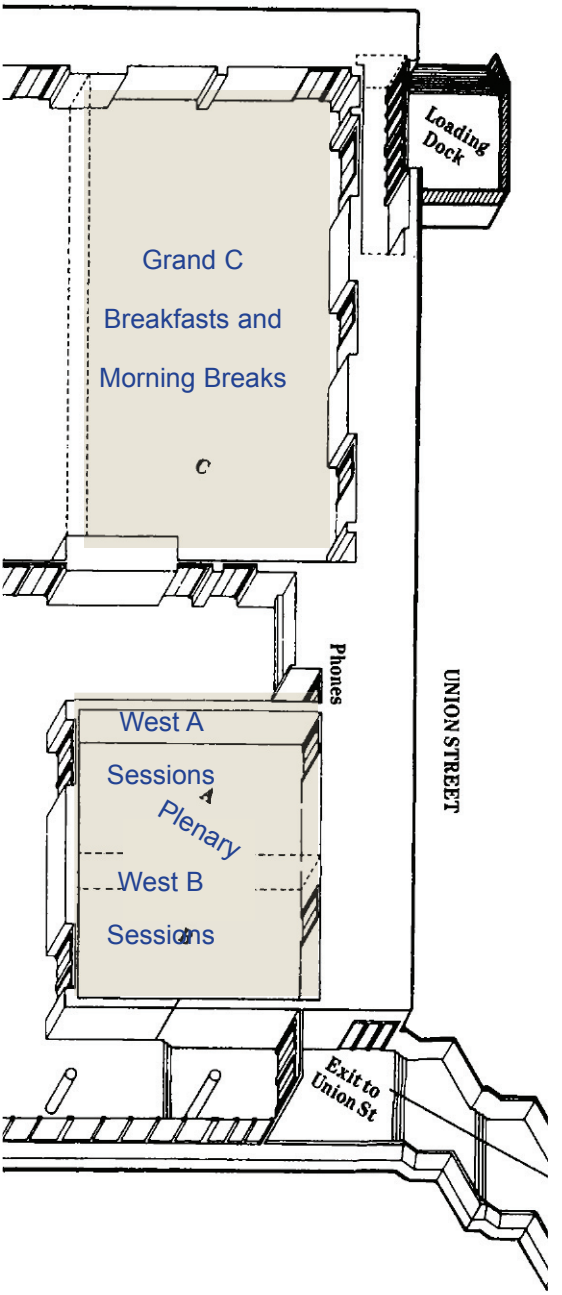
18:30 **Boeing tour.**

20:30 **Shuttle return to hotel.**

2nd Floor - Sheraton



2nd Floor - Sheraton



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