A. Scott Howe, PhD bio summary

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A. Scott Howe has a PhD in architecture from University of Michigan, and a second PhD in Industrial and Manufacturing Systems Engineering, focusing on self-assembling structures and modular robotic construction systems.

Dr. Howe is currently located at Jet Propulsion Laboratory (JPL) in the Mission Systems Concepts Section, Exploration Systems Concepts group. He has served as a licensed practicing architect emphasizing modular compact buildings, habitats, and deployable structures, and has 19 years experience engineering robotic construction systems with significant skills in configuration, structures, and hands-on hardware assembly. Dr. Howe has 10 years experience working in Japan on building design, kit-of-parts modular building systems, and automated construction research with Kajima Corporation, Shimizu, and Hazama. He is widely published in journals, conferences, and has contributed to book projects as editor and chapter contributor. Selected projects and publications can be viewed on his webpage: **http://www.plugin-creations.com/us/ash/**

Before joining JPL, Dr. Howe served as faculty member at University of Oregon for 3 years, and Hong Kong University for 6 years. He has extensive experience creating curriculum and organizing special workshops, in both domestic and overseas programs. He currently serves as Chair for the Space Architecture Technical Committee (SATC) in the American Institute of Aeronautics and Astronautics (AIAA), and has experience organizing and chairing technical conferences, tracks, and sessions.

Dr. Howe currently serves on the Constellation Lunar Surface Systems Architecture team, as a member of the All-Terrain Hex-Limbed Extra-Terrestrial Explorer (ATHLETE) robotic mobility system development team, LSS Mobility Team, and LSS Habitation Team. He is co-inventor of the Tri-ATHLETE concept, and serves as element lead, supporting the scenarios for the Lunar Surface Systems outpost.

Dr. Howe also currently serves on Team X, a concurrent engineering formulation team. He has experience as mechanical and configuration lead on a variety of formulation projects, and has functioned in both lead and supporting roles for proposal writing and mission planning.

Dr. Howe is committed to the development of advanced robotic machines and infrastructures and their integration with human space exploration objectives. He believes it is the destiny of humankind to learn to live and work in space, and eventually become a space-faring civilization.

Curriculum Vitae

A. Scott Howe, PhD

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EDUCATION:

2007 DOCTOR OF PHILOSOPHY (Industrial and Manufacturing Systems Engineering), Hong Kong University Department of Engineering, Hong Kong. Thesis: modular robots for self-constructing building systems.

1998 DOCTOR OF PHILOSOPHY (Architecture), University of Michigan School of Architecture + Urban Planning, Ann Arbor, Michigan. Major: design methods, minor: engineering design. Thesis: a new paradigm for life-cycle management of kit-of-parts building systems.

1997 MASTER OF SCIENCE degree, University of Michigan School of Architecture + Urban Planning, Ann Arbor, Michigan.

1989 MASTER OF ARCHITECTURE degree, University of Utah Graduate School of Architecture, Salt Lake City, Utah, including one year at Kanagawa University, Yokohama, Japan.

1987 BACHELOR OF UNIVERSITY STUDIES degree (with emphasis on East Asian Studies), University of Utah, Salt Lake City, Utah, Minor in Japanese language.

PROFESSIONAL EXPERIENCE:

LICENSED ARCHITECT: NCARB #53493, California #C21983, Oregon #4435.

2007-present SENIOR SYSTEMS ENGINEER, National Aeronautics and Space Administration (NASA) / Caltech, Jet Propulsion Laboratory, (JPL) Mission Systems Concepts Section, Exploration Systems Concepts group, Pasadena, California. Duties: robotic construction research.

2006-2007 CONSULTING RESEARCH SCIENTIST, Carnegie Mellon Innovations Lab, Carnegie Mellon West Campus, NASA Ames, Moffett Field, California. Duties: automated construction.

2006 VISITING RESEARCHER, NASA Ames Research Center, Autonomous Systems and Robotics Area, Intelligent Robotics Group. Duties: Collaborative work in mobile and modular robotics for planetary surfaces.

1998-present PRESIDENT of Plug-in Creations Architecture, LLC, Eugene, Oregon. Duties: system engineering, architectural services, industrial design, construction robotics, human factors. Plug-in Creations is a partner of ZeroImpactPlaces.com Architects.

1988-1998 ARCHITECT with Kajima Corporation, Tokyo, Japan. Duties: Conceptual design, robotic construction, and building systems, human factors research.

1978-1984 DESIGNER and PROJECT MANAGER for Barmakian/Wolff/Lang/Christopher, Architects, Rancho Cucamonga, California. Duties: Full range of architectural services.

ACADEMIC EXPERIENCE:

2001-2007 ASSISTANT PROFESSOR (Lecturer), University of Hong Kong Department of Architecture, Duties: developing curriculum, studio instruction, and instructing design techniques using computer tools. Research: Robotics in construction, aerospace architecture, Kit-of-parts.

1998-2001 ASSISTANT PROFESSOR (visiting), University of Oregon Department of Architecture, Eugene, Oregon. Duties: developing curriculum, studio instruction, and instructing design techniques using computer tools. Research: Construction robotics, kit-of-parts systems.

OTHER EXPERIENCE & SKILLS:

1984-present COMPUTER AIDED DESIGN TOOLS: CATIA, Form Z, Unigraphics NX, Solid Works, other. OTHER TOOLS: C, C++, Java programming languages. Matlab, STK, and other tooks.

LANGUAGES: Native English, fluent written and spoken Japanese.

HONORS, AWARDS & PATENTS (selected) **:**

2001 SPECIAL PRIZE FOR DIGITAL PROCESS for Digiosk design and manufacturing in "Far Eastern International Digital Architecture Design" competition presented by the Far Eastern Foundation.

2000 DESIGN MERIT AWARD for Plug-in Condominiums in "Far Eastern International Digital Architecture Design" competition presented by the Far Eastern Foundation.

1997 WINNER of the International Audi Design competition for outstanding design of the QAMEL modular vehicle design.

1990 PATENTS co-inventor of DYNAMIC INTELLIGENT BUILDING (DIB-200) technology: "Ultra-high Multi-story Buildings and Construction Thereof" Japan patent #2600489, US patent #5,377,465, Canadian patent #2,063,807 owned by Kajima Corporation.

PUBLICATIONS (selected) **:**

2007 JOURNAL ARTICLE A.S. Howe (2007). Self-assembling Modular Robotic Structures (M-RA.2007.908986). IEEE Robotics & Automation Magazine, Volume 14, Issue 4, pp26-33. ISSN 1070-9932.

2007 DISSERTATION A.S. Howe (2007). Modular Robots for Self-constructing Building Systems. Ph.D. dissertation, University of Hong Kong.

2006 JOURNAL ARTICLE A.S. Howe (Feb 2006). Cassette Factories and Robotic Bricks: a Roadmap for Establishing Deep Space Infrastructures (SAE 2005-01-2911). *2005 Transactions Journal of Aerospace*, pp330-363. ISBN 0-7680-1687-8. Warrendale, PA: Society of Automotive Engineers.

1998 DISSERTATION A.S. Howe (1998). *A New Paradigm for Life-cycle Management of Kit-of-parts Building Systems*, Ph.D. dissertation, University of Michigan.

ORGANIZATIONS & ACTIVITIES (selected) **:**

2000-present MEMBER American Institute of Aeronautics and Astronautics (AIAA) Space Exploration Process Committee (SEPC), and CHAIR Space Architecture Technical Committee (SATC) see webpage: http://www.spacearchitect.org.

1997-1998 MEMBER representative for Kajima Corporation in the international Intelligent Manufacturing Systems (IMS) research group, GNOSIS team and IF7 team.

1980-1982 MISSIONARY in Fukuoka, Japan for The Church of Jesus Christ of Latter-day Saints (Mormon).