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CAREER OBJECTIVE

To use my expertise in Engineering, Mathematics, 3D Graphics and Object Oriented Programming to develop intelligent software and products for industry and education.

AREAS OF EXPERTISE

Very good in Engineering, Mathematics, Numerical Analysis, Object Oriented and Structured Programming (Smalltalk, C#, C/C++, Java, FORTRAN), Multibody Dynamics, Vibrations, Controls, Virtual Worlds, 3D CAD, Solid Modeling, OpenGL, COM, AutoCAD API.
Good in Finite Element Analysis, Stochastic Processes, Statistics, Systems Engineering.
Developing in OpenCL, Image Processing, Geometric Algebra, Photogrammetry.

PERSONAL

Birth: 1957 Health: Excellent
Married: 1989 Citizenship: Malaysia, USA pending
Children: Sons (93, 01, 07), Daughters (96, 98) Permanent Resident: USA since 1986

LANGUAGES

English: Excellent Spoken and Written Chinese: Fair Spoken
Malay: Good Spoken and Written French: Poor Spoken and Written

EDUCATION

1985 PhD in Engineering Mechanics, GPA 4.0/4.0, The University of Texas at Austin
1982 MSE in Civil Engineering, GPA 3.4/4.0, Princeton University
1979 BA Honours in Engineering, First Class, Cambridge University

PROFESSIONAL EXPERIENCE

1999–... Founder, Software Developer, ASKOH.COM LLC
Dec 2009-May 2010: Consultant to National Digital Research Centre, Ireland.
Developed a Virtual World Learning System using Cobalt/Smalltalk. Modified Cobalt to import OGRE and OBJ avatars files with animations. Customized Cobalt UI.
Oct-Dec 2009: Consultant to BedRock Software LLC, USA.
Integrated 3D CAD into AggFlow using VisualWorks Smalltalk.
Jun 2009-present: Co-developing Motion addon for SketchUp using Squeak/Smalltalk.
Current Squeak Virtual Machine cannot be called by external programs.
Converting Squeak Virtual Machine to a DLL will make that possible. The VM

is C code which processes the bytecode of Squeak Smalltalk.

Jan-Jun 2009: Consultant to Duke University, USA.

Smalltalk development for Cobalt Virtual World: Cobalt KMZ importer, Cobalt VNC, Cobalt Debugging.

Aug 2008-present: Co-developing Motion addon for Inventor using C#

Jan 2010: Released IN-Motion for Inventor.

Nov 2007-present: Co-developing Motion addon for AutoCAD using C#

Jun 2007-present: Collaboration with Duke University, USA.

Porting freeCAD to Croquet/Cobalt which is a 3D Virtual World environment written in Smalltalk.

2010: Mentoring Google Summer of Code student for this project. Adding boolean operation of shapes.

2008: Mentored Google Summer of Code student for this project.

Jun 2007-May 2008: Co-developed dynamic web application using Seaside

<http://caartz.com> is a shopping list manager developed using Seaside, which is a web framework written in Smalltalk.

Jun 2006-present: Collaboration with Multimedia University, Malaysia.

Supervising 2-3 Final Year Student Projects per year on Smalltalk and CAD projects.

Apr 2006-Dec 2008: Consultant to Zynatech Inc., USA.

Created CAD automation for die design of rotary cutting tools. Used Smalltalk and Visual Lisp to drive AutoCAD.

Oct 2005-present: Co-developing and commercializing

Alibre Motion: 3D Motion Simulation for Alibre Design

Developed COM server for motion simulation using CADSM and VisualWorks COM Connect. Used it in motion addon for Alibre Design.

Sep 2006: Released Alibre Motion bundled with Alibre Design Expert.

Aug 2005-present: Volunteer MATHCOUNTS coach at Aspen Elementary School, Los Alamos, NM, USA.

Jul 1999-present: Developing and commercializing

freeCAD and CADSM: 3D CAD with Motion Simulation

They are basic 3D CADs with advanced Motion Simulation capabilities.

Their motion simulation capabilities are comparable to the best and can provide accurate answers to engineers and scientists in diverse fields.

Educators, students and new engineers will find it ideal for the teaching and learning of geometry, kinematics, dynamics, vibrations, mechanisms, linkages, cams, machine design and physics. The program runs on Windows, Linux PC, Macintosh PPC and other Unix's. Assembly data are unchanged across platforms.

Software used:

VisualWorks Smalltalk development system, OpenGL 3D graphics, Business Graphics Object Kit (BGOK), Binary Object Streaming Service (BOSS), Advanced Tools Parser Compiler, DLL and C Connect (DLLCC), GF/ST Graphics Framework, Jun for Smalltalk 3D Graphics Library, RSA encryption, Persistence of Vision Raytracer (POV-Ray).

Software components developed:

GUI for 3D CAD with full 3D pan, zoom, tilt and rotate on an assembly of

solids in wireframe or rendered graphics. 2D editor for rectangle, circle, ellipse, and polygon. Grapher for multivariant data. Math components for full and sparse matrix algebra, matrix solvers, Newton Raphson root finder, differential equation solver, symbolic manipulator, fast fourier transform. Multibody dynamics components for motion simulation of dynamics and kinematics of machines. Contact and collision detection algorithms. Radial Edge Non-Manifold Topology kernel. DXF and STEP parsers.

Jul 2004: Released CADSM: 3D CAD with Motion Simulation

Dec 2000: Open Sourced StCAD: 3D CAD Framework in Smalltalk

Jul 2000: Released freeCAD: 3D CAD with Motion Simulation

1998–1999 Technical Specialist, Mechanical Dynamics Inc. (now part of MSC.Software)

DTI merged with Mechanical Dynamics Inc. for \$1,500,000

Programmed a redundant constraint removal algorithm in ADAMS C++, the motion simulation solver most widely used in the automotive and aerospace industries. Used MS Visual C++ and CVS in Windows and Unix.

1995–1997 Cofounder and Technical Director, Design Technologies International

Developed and commercialized Dynamic Designer Motion - a kinematic and dynamic simulation package for mechanisms.

Integrated motion solver (Smalltalk) to AutoCAD and AutoDesk Mechanical Desktop (C++).

Added improved solver and curve-curve contact. Supported sales and marketing. Responded to customer requests.

DTI was a Mechanical Application Initiative partner of AutoDesk.

DDM was awarded 1996 Editor's Choice by CADENCE magazine.

1991–1995 Senior Lecturer, Sch. Mech. & Prod. Engrg., Nanyang Tech. Univ.

Lectured and tutored undergraduate course: Dynamics of Machines.

Initiated and conducting research projects. Supervised final year projects.

Developed Dynamic Designer Motion, the first general purpose 3D dynamics simulator program for industry in Asia. It is OOP based (Smalltalk) and has AUTOCAD input and animation output capabilities. Ready for commercialization in 1995.

Published 5 journal papers, 6 conference papers, 1 report.

Offered consultancy and short course on dynamic simulation.

1985–1991 Assistant Professor, Dept. Mech. Engrg., Texas Tech Univ.

Lectured undergraduate and graduate courses: Mechanical Systems Lab.,

Dynamics, Dynamics/Controls of Systems, Advanced Dynamics, Vibrations,

Random Vibrations, Numerical Analysis of Engineering Systems.

Initiated and conducted 7 research projects.

Object Oriented Dynamics Modeler (Smalltalk, Excel, C)

Quantitative Flow Visualization via 3D Particle Tracking (C)

Numerical Experiments in Random Vibrations (C)

Base-Isolation Benefits of Rocking and Uplift (FORTRAN)

Noncontact Semiconductor Wafer Handling

Vehicle Response to Aerodynamic Loads (FORTRAN)

Wind Engineering (FORTRAN)

Improving the Method of Equivalent Linearization

Advised 2 PhD and 7 MS students.

Published 7 journal papers, 8 conference papers, 3 reports.

Performed numerous services for department, college, university, and community.

Reviewed for ASME J. Comp. Control, ASME Energy Tech. Conf. and Expo.,

ASCE J. Engrg. Mech., ASCE J. Comp. in Civil Engrg., National Science

Foundation, J. App. Mech., Earthquake Engrg. & Struc. Dyn.

1984–1985 Visiting Lecturer, Dept. Mech. Engrg., Texas Tech Univ.

Lectured undergraduate Dynamics and Vibrations.

1981–1984 Research Asst., Dept. Aerospace Engrg./Engrg. Mech., Univ. of Texas, Austin

Conducted graduate research for PhD. Programmed simulation in FORTRAN for

Rocking and Toppling of Block-Like Structures on Rigid or Flexible

Foundations Subjected to Harmonic or Random Excitations.

1982–1984 Asst. Instructor, Dept. Aerospace Engrg./Engrg. Mech., Univ. of Texas, Austin

Lectured undergraduate Statics, Dynamics, and Mechanics of Solids.

1979–1981 Research Assistant, Dept. Civil Engrg., Princeton Univ.

Conducted graduate research for MSE. Programmed simulation in FORTRAN

for Three-Dimensional Dynamic Analysis of Nonhomogeneous Earth Dams

Using the Rayleigh-Ritz Method.

Fall 1980 Laboratory Assistant, Dept. Civil Engrg., Princeton Univ.

RESEARCH AND DEVELOPMENT PROJECTS

Funded

2009–2010 "V-Learning: Virtual World Learning System," National Digital Research Center, Ireland, Cobalt Smalltalk software development provided.

2009 "RokCAD: 3D CAD inside AggFlow," Bedrock Software, USA, Smalltalk software development provided.

2008 "Cobalt KMZ importer, Cobalt VNC, Cobalt debugging," Duke University, USA, Smalltalk software development provided.

2006–2008 "CAD Automation," Xynatech Inc., USA, AutoCAD, Visual Lisp and Smalltalk software development provided.

2005 "Graphical Tools," Ergotech Systems Inc., USA, Java software development provided.

2003 "Isolation of Airborne Optical Bench," HYTEC Inc., USA, vibration simulation consultancy provided.

2002 "Motion Simulation of Helang Topdeck Installation," Nippon Oil Exploration, Malaysia, dynamic simulation consultancy provided.

1994 "Dynamic Designer Motion," Design Technologies International Pty. Ltd., Australia, hardware and software provided.

1993 "Simulation of AA gun using multibody dynamics software," Allied Ordnance of Singapore, \$5000.

1992–1995 "Object Oriented Dynamics Simulator," ATS ComputerCentre, hardware and software provided.

1992–1995 "Object Oriented Dynamics Simulator," Defence Science Org., hardware and software provided.

1990–1991 Co-PI, "Noncontact Semiconductor Wafer Handling," part of "Productivity of Single Wafer Fabrication Cell," State of Texas, \$52,560.

- 1989 Co-PI, "Vehicle Response to Aerodynamic Loads," Ford Motor Co., \$222,308.
1988 Co-PI, "Vehicle Response to Aerodynamic Loads," Ford Motor Co., \$155,706.
1987 Co-PI, "Wind Engineering," Ford Motor Company, \$133,794.
1985–1986 "Improving the Method of Equivalent Linearization," Texas Tech University, \$7000.

Not Funded

- 1990–1991 "Object Oriented Dynamics Modeler"
1989–1991 "Quantitative Flow Visualization via 3D Particle Tracking (3DPT)"
1986–1989 "Numerical Experiments in Random Vibrations".
1985–1989 "Base-Isolation Benefits of Rocking and Uplift"

INVENTION DISCLOSURE

- 1990 "Noncontact Handling of Semiconductor Wafer," Research Corporation Technologies, Arizona paid \$1000 to review it for patent and commercial potentials.

WORKSHOPS AND SEMINARS

- 1992 "Multibody Dynamics: Introduction and Applications" for Continuing Education.
1992 "Multibody Dynamics: Introduction and Applications" for Singapore Aerospace.
1992 Statics and Vibrations short courses for Texas Instruments.
1989 Base Isolation Workshop, San Francisco

PUBLICATIONS

Journal Articles

- 1996 Koh, A-S. and Wegienka, A. "Dynamic Designer: A Multibody Dynamics Software" *Computer & Graphics*, 1996, 20(1) 77-78.
1995 Lee, Y.T., and Koh, A-S. "Performing Euler Angle Rotations in CAD Systems" *J. CAD*, 1995.
1994 Koh, A-S., and Park, J-P. "Object Oriented Dynamics Simulator," *Computational Mechanics*, Jun 1994, 14(3) 277–287.
1994 Koh, A-S., "Why Use Object Oriented Programming in Engineering?" *Mechanical Engineer*, ASME Singapore Chapter 1993–94 Yearbook, Singapore, Aug 1994, 54–60.
1992 Koh, A-S., and Du, H. "Multibody Dynamics Theory and Applications," *J. The Inst. of Engineers*, Singapore, 1992, 32(7) 74-79.
1992 Koh, A-S., Ford, R.G., and Seshadri, T. "Wafer Handling with Levitation," *J. Electronic Manufacturing*, U.K., 1992, 2(3), 101–107.
1991 Koh, A-S. and Hsiung, C-M. "Base Isolation Benefits of Rocking and Uplift: Theory," *J. Engrg. Mech. Div., ASCE*, 117(1), 1–18.
1991 Koh, A-S. and Hsiung, C-M. "Base Isolation Benefits of Rocking and Uplift: Numerical Example," *J. Engrg. Mech. Div., ASCE*, 117(1), 19–31.
1990 Koh, A-S. and Mustafa, G. "Free Rocking of Cylindrical Structures," *J. Engrg. Mech. Div., ASCE*, 116(1), 35–54.
1986 Koh, A-S. "Rocking of Rigid Blocks on Randomly Shaking Foundations," *J. of Nuclear Engrg. and Design*, 97(2), 269–276.

- 1986 Koh, A-S., Spanos, P.D. and Roesset, J.M. "Harmonic Rocking of Rigid Blocks on Flexible Foundation," *J. Engrg. Mech. Div., ASCE*, 112(11), 1165–1180.
- 1986 Spanos, P.D. and Koh, A-S. "Analysis of Block Random Rocking," *Soil Dyn. and Earthquake Engrg.*, 5(3), 178–183.
- 1984 Spanos, P.D. and Koh, A-S. "Rocking of Rigid Blocks Due to Harmonic Shaking," *J. Engrg. Mech. Div., ASCE*, 110(11), 1627–1642.
- 1982 Abdel-Ghaffar, A.M. and Koh, A-S. "Three-Dimensional Dynamic Analysis of Nonhomogeneous Earth Dams," *Soil Dyn. and Earthquake Engrg.*, 1(3), 136–144.
- 1981 Abdel-Ghaffar, A.M. and Koh, A-S. "Earthquake Induced Longitudinal Strains and Stresses in Nonhomogeneous Earth Dams," *Earthquake Engrg. and Struc. Dyn.*, 9, 521–542.
- 1981 Abdel-Ghaffar, A.M. and Koh, A-S. "Longitudinal Vibration of Nonhomogeneous Earth Dams," *Earthquake Engrg. and Struc. Dyn.*, 9, 279–305.

Proceedings

- 2007 Koh, A-S., "3D CAD with Motion Simulation", Proc. Smalltalk Solutions 2007, Toronto, ON, Canada.
- 2004 Koh, A-S., "StCAD: 3D CAD Framework in Smalltalk", Proc. Smalltalk Solutions 2004, Seattle, WA.
- 1993 Koh, A-S., and Lee, Y.T. "Kinematic and Dynamic Simulation of Weapons" Proc. MINDEF/NTU Seminar '93, Singapore, 1993, 119–124.
- 1993 Koh, A-S., "Object Oriented View of Multibody Dynamics" Proc. Asia-Pacific Vibration Conference '93, Japan, 1993, 1243–1248.
- 1993 Koh, A-S., "Automated Kinematic and Dynamics Analysis for Product Design", Proc. ManuTech 93, Singapore, Sep. 1993, 101-107.
- 1992 Koh, A-S., and Du, H. "Multibody Dynamics Theory and Applications," MINDEF/NTU Seminar, Singapore, Nov. 1992, 57–65.
- 1992 Koh, A-S., and Park, J.P. "Combining Multibody Dynamics and Object Oriented Programming," Int. Conf. Comp. Mech. (ICCME92), Singapore, Nov. 1992, 381–386.
- 1992 Koh, A-S., Ford, R.G., and Seshadri, T. "Noncontact Handling of Semiconductor Wafers," *Manufacturing International '92 Conf.* 51-62, Dallas, TX, U.S.A.
- 1990 Ford, R.G., and Koh, A-S. "Noncontact Semiconductor Wafer Handling," Soc. of Manufacturing Engrs. 2nd Annual Conf. on Semiconductor Manufacturing, Tempe, AZ.
- 1989 Koh, A-S. and Lin, D-C. "Large Monte Carlo Simulation of Duffing Equation," 5th Int. Conf. on Structural Safety and Reliability, 1137–1144, San Francisco, CA.
- 1989 Koh, A-S. and Hsiung, C-M. "Parametric Study of 3D Rocking and Uplift," Proc. Pan American Congress of App. Mech., 198–201, Rio de Janeiro, Brazil.
- 1988 Koh, A-S. and Hsiung, C-M. "Base Isolation Benefits of Rocking and Uplift: Theory," Proc. ASCE 7th Engrg. Mech. Div. Specialty Conf., 91, Virginia Polytechnic Institute.
- 1988 Koh, A-S. and Lin, D-C. "The First Passage Problem: Duffing Equation," Proc. ASCE Probabilistic Methods in Civil Engrg. Conf., 480–483, Virginia Polytechnic Institute.
- 1987 Koh, A-S. and Mustafa, G. "3D Rocking and Toppling on Rigid Foundations," Proc. ASCE 6th Engrg. Mech. Div. Specialty Conf., 254, Buffalo, New York.

- 1986 Spanos, P.D. and Koh, A-S. "Rigid Body Random Rocking Prediction," Proc. 3rd ASCE Engrg. Mech. Div. Specialty Conf. on Dyn. Res. of Struc., 684–691, Los Angeles, CA.
- 1985 Spanos, P.D. and Koh, A-S. "Stochastic Response of Rigid Blocks on Flexible Foundations," Proc. 8th Int. Conf. on Struc. Mech. in Reactor Tech., 327–332, Brussels, Belgium.
- 1984 Spanos, P.D. and Koh, A-S. "Harmonic Rocking Response of Rigid Equipment Models," Proc. Symposium on Earthquake Effects on Plant and Equipment, 157–167, India.
- 1984 Koh, A-S. and Spanos, P.D. "Seismically Induced Rocking of Rigid Structures," Proc. Eighth World Conf. on Earthquake Engrg., Paper No. 63, San Francisco, CA.
- 1982 Abdel-Ghaffar, A.M. and Koh, A-S. "3D Dynamic Analysis of Nonhomogeneous Earth Dams," Proc. Int. Conf. on Soil Dyn. and Earthquake Engrg., England.
- 1982 Koh, A-S. "3D Dyn. Anal. of Nonhomo. Earth Dams Using the Rayleigh-Ritz Method," Proc. 13th Southwestern Grad. Res. Conf. in App. Mech., 213–219, Norman, OK.

Reports

- 1993 Koh, A-S., "Analysis of AOS AA Gun Using Multibody Dynamics Software", to Allied Ordnance of Singapore, Singapore.
- 1989 Koh, A-S., Park, J-P., and Hsiung, C-M. "Simulation Study of Crosswind Sensitivity," TR–FMC–89–6 to Ford Motor Co. USA.
- 1989 Koh, A-S., Park, J-P., and Hsiung, C-M. "Simulation Study of Crosswind Sensitivity: Supplement," TR–FMC–89–7 to Ford Motor Co., USA.
- 1988 Koh, A-S. and Muyshondt, A. "Vehicle Response to Aerodynamic Loads," TR–FMC–88–4 to Ford Motor Co., USA.

Dissertation

- 1984 "Rocking and Toppling of Block-Like Structures on Rigid or Flexible Foundations Subjected to Harmonic or Random Excitations," The University of Texas at Austin.

Thesis

- 1982 "Three-Dimensional Dynamic Analysis of Nonhomogeneous Earth Dams Using the Rayleigh-Ritz Method," Princeton University.