AIK-SIONG KOH, PhD

3765A Villa Street
Los Alamos, NM 87544
USA

Phone: (505) 310-2069
Email: askoh@askoh.com
Website: http://ar-cad.com

CAREER OBJECTIVE

To use my expertise in Engineering Mechanics, Mathematics, 3D Graphics and Object Oriented Programming to develop intelligent software or products for scientific, industrial and educational applications.

LEADERSHIP ABILITIES

Founder of ASKOH.COM, LLC,
  Serving numerous clients as consultant. Developing, delivering, and supporting commercial quality scientific software. Skilled at discerning and meeting customer needs. Successful at collaborating with universities and individuals to create software.
Cofounder and Technical Director, Design Technologies International.
  Developing, delivering, and supporting commercial quality scientific software.
Assistant Professor, Texas Tech University.
  Experienced in mentoring junior researchers (supervised 2 PhD and 7 MS students).

TECHNICAL AREAS OF EXPERTISE

Very good in Engineering Mechanics, Mathematics, Numerical Analysis, Object Oriented and Structured Programming (Smalltalk, C#, FORTRAN), Multibody Dynamics, Vibrations, Controls, Virtual Worlds, 3D CAD, Solid Modeling, NURBS, OpenGL, COM, AutoCAD API, STEP.

Good in Finite Element Analysis, Stochastic Processes, Statistics, Systems Engineering, C/C++, Java, LISP, SQL, .NET.

Developing in OpenCL, Image Processing, Geometric Algebra, Photogrammetry.

PERSONAL

Birth: 1957
Married: 1989
Children: Sons (93, 01, 07), Daughters (96, 98)

Health: Excellent
Citizenship: USA

LANGUAGES

English: Excellent Spoken and Written
Malay: Good Spoken and Written

Chinese: Fair Spoken
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

Feb 2011-present: Contractor to Northern Natural Gas, USA.
Supporting and enhancing Throughput Management System using VisualWorks Smalltalk, MS SQL and Java in distribute environment using Agile programming.

Apr 2010-present: Co-developing and commercializing
SC-Motion: 3D Motion Simulation for SpaceClaim CAD
Using Smalltalk, C#, .NET and COM
Feb 2012: Released of SC-Motion 1.0.

Jun 2006-present: Collaborating with Multimedia University, Malaysia.
Supervising 2-3 Final Year Student Projects per year using Smalltalk, C#, Java and CAD.

Oct 2005-present: Co-developing and commercializing
Alibre Motion: 3D Motion Simulation for Alibre Design CAD
Sep 2006: Released Alibre Motion bundled with Alibre Design Expert.

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, Macintosh and Unix. 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

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-Dec 2010: 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-Dec 2010: Co-developing Motion addon for Inventor CAD using C#
Jan 2010: Released IN-Motion for Inventor.

Nov 2007-Dec 2010: Co-developing Motion addon for AutoCAD using Visual LISP and C#

Jun 2007-Dec 2010: Collaborating 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-developing dynamic web application using Seaside
http://caartz.com is a shopping list manager developed using Seaside, which is a dynamic web framework written in Smalltalk.

Apr 2006-Dec 2008: Consultant to Xynatech Inc., USA.
Created CAD automation for die design of rotary cutting tools. Used Smalltalk and Visual LISP to drive AutoCAD.

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 degree. 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.
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.
1989 Co-PI, "Vehicle Response to Aerodynamic Loads," Ford Motor Co.
1988 Co-PI, "Vehicle Response to Aerodynamic Loads," Ford Motor Co.
1987 Co-PI, "Wind Engineering," Ford Motor Company.
1985–1986 "Improving the Method of Equivalent Linearization," Texas Tech University.

INVENTION DISCLOSURE

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

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.