

THOMAS J. IMPELLUSO
Thomas J. Impelluso
Mechanical and Marine Engineering
Western Norway University of Applied Sciences
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PROFESSIONAL PREPARATION

University of California,	San Diego	Computational Mechanics	Ph.D.	1990
Columbia University,	New York City	Bioengineering	M.S.	1983
Columbia University,	New York City	Civil Engineering	B.S.	1982
Columbia University,	New York City	Art History	B.A.	1981

GENERAL INTERESTS

Mechanics, mechanical engineering, physics based virtual reality, simulation science, programming, 3D computer graphics, network programming, education theory, distance learning, informal science education for the public

ACADEMIC APPOINTMENTS

SDSU	Professor	08/2009-current
SDSU	Associate Professor with tenure	08/2004-08/2009
SDSU	Assistant Professor	05/1999-08/2004
SDSU	Lecturer	05/1998-05/1999
UCSD	Post-doc/Lecturer/Research Scientist	01/1993-12/1998

INDUSTRIAL APPOINTMENTS

Project Manager, Science Horizons, Inc.
Developed and managed seismic data and visualization software on contract to the USGS.
Gave presentations and demonstrations in Spain, Scandanavia, Japan.

ADDITIONAL

Currently a staff writer for the American Association for the Advancement of Science. In this capacity I write one article a week on various topics in Science and Engineering.

HONORS & AWARDS

Best Teacher Award	SDSU	2009
Distinguished Teaching	Pacific Southwest, ASEE	2009
InterWorks Fellow for Universal Design	Interwork Institute	2009
People, Information, Technology Fellow	San Diego State University	2008
Technology Deployment Award	San Diego State University	2008

Summer Institute Fellowship	National Science Foundation	2006
First Place, Poster Presentation	Medicine Meets Virtual Reality	2005
Outstanding Faculty	SDSU Cap&Gown Mortar Board	2004
Advisor: Two 1st place students	Computational Science Olympics	2003
TRW Excellence in Teaching Honor	TRW Defense Systems, Inc.	2002
Frontiers in Education, Faculty Fellow	FIE Conference	2001
Education Center Faculty Fellow	NPACI EdCenter	2000

Awarded NIH Training Grant T32 NS 7078-10,11,12 (6/1/87 until 12/31/89) in the amount of \$16,926. The Program Director for this grant was Henry C. Powell in the Dept. of Pathology at UCSD. Funded by NIH National Institute of Neurological Disorders and Stroke (NINDS).

REGIONAL SERVICE

Reuben H. Fleet Science Exhibit Consultant: Guided students to develop “Einstein, The Wonder Years.” <http://attila.sdsu.edu/~anash/spacemuseum/web/home.html>

PROFESSIONAL MEMBERSHIPS

AMERICAN SOCIETY OF MECHANICAL ENGINEERS
AMERICAN SOCIETY OF ENGINEERING EDUCATION

NATIONAL SERVICE

NSF Consultant: Workshop on Grid Computing for Engineering. June 6-7, 2003

DARPA Consultant: Physically Based Virtual Reality for Telepresent Battlefield Surgery. Update Advanced Biomedical Technology Program. Medicine Meets Virtual Reality. January 17, 1996. San Diego, California.

Physically Based Virtual Reality for Telepresent Battlefield Surgery. Workshop 95 Update Advanced Biomedical Technology Program. Image Conference. July 1995. Phoenix, Az.

NSF Panel Reviewer: Science and Engineering Information and Informatics: SEI-MPE (multi-disciplinary physics and engineering). April 24-25, 2006

NSF Panel Reviewer: CI-TEAM. October 20-23, 2007

National Assessment of Educational Progress, January 20-26, 2010, Austin, Texas. Assisted in evaluating 1000 K12 Science Exam questions, and establishing the nation’s cut scores.

Board of Director Service, Pacific SouthWest Conference of American Society of Engineering Education: 2010-2012

Reviewer for the American Society of Engineering Education, K12 Division; 2011-2012. K12. Headmaster’s Council, Warren Walker Academy.

SERVICE TO STUDENTS

Yocoya Instructor- Univesrity Seminar Program, 2008: Special instructor to first generation University Students

UNIVERSITY SERVICE

<i>Advisor:</i>	<i>Sustainability Committee, Geoff Chase, Chair</i>	2010-2010
<i>Advisor:</i>	<i>Special Study Learning Integration Modules C. Williams:</i>	2010-2011
<i>Committee</i>	<i>Strategic Planning, ATI: Americans w/. Disabilities</i>	2009-2010
<i>Committee</i>	<i>Information and Instructional Technology Committee</i>	2009-2010
<i>Committee</i>	<i>Information and Instructional Technology Committee</i>	2008-2009
<i>Committee</i>	<i>Information and Instructional Technology Committee</i>	2007-2008
<i>Committee</i>	<i>Information and Instructional Technology Committee</i>	2006-2007
<i>Committee:</i>	<i>Undergraduate Council, SDSU</i>	2007-2008
<i>Committee:</i>	<i>Undergraduate Council, SDSU</i>	2008-2009
<i>Secretary:</i>	<i>College of Engineering, San Diego State University,</i>	2005-2008
<i>Committee:</i>	<i>Departmental Reappointment, Tenure and Review,</i>	2005-2006
<i>Committee:</i>	<i>Honors and Awards,</i>	2005-2006
<i>Secretary:</i>	<i>College of Engineering, San Diego State University,</i>	2004-2005
<i>Committee:</i>	<i>Information Technology of the SDSU Senate,</i>	2005-2006
<i>Committee:</i>	<i>Department of Mechanical Engineering By-Laws</i>	2005-2006
<i>Committee:</i>	<i>Department of Mechanical Engineering Web Design</i>	2005-2006
<i>Panel:</i>	<i>SDSU Foundation: Grant Writing,</i>	2005-2006
<i>Committee:</i>	<i>Honors and Awards,</i>	2004-2005
<i>Committee:</i>	<i>Departmental Reappointment, Tenure and Review,</i>	2004-2005
<i>Secretary:</i>	<i>College of Engineering, San Diego State University,</i>	2003-2004
<i>Secretary:</i>	<i>College of Engineering, San Diego State University,</i>	2002-2003
<i>Secretary:</i>	<i>College of Engineering, San Diego State University,</i>	2001-2002
<i>Host</i>	<i>Grantsmanship process: hosted workshop</i>	2005

JOURNAL REVIEWER

Journal Reviewer: Frontiers in Education Conference

Journal Reviewer: Journal of Biomechanics.

Journal Reviewer: International Journal of Engineerng Education

Journal Reviewer: International Network Engineering Education and Resarch

Journal Reviewer: American Journal of Distance Education

INTERNATIONAL EDUCATION SERVICE:

Javier Palacios Arauzo & David Fernández González	(09/01/06 – 06/30/07)
Alma María Rubio Guerra & Alvaro Zanón Alonso	(09/01/05 – 06/30/06)
Juan Pena de Juana & David Garcia	(09/01/04 - 06/30/05)
Alberto Miguel Ausin & Julian Sanz Angulo	(08/18/03 - 06/30/04)

Carlos Gallego Castro & Luis Angel Belenguer	(08/26/02 - 06/25/03)
Javier Fernandez Costero & Blanco Redondo	(08/23/01 - 07/01/02)
Raul Bermejo Moratinos & Elena López Tarragato	(09/01/00 - 06/30/01)
Carlos Caceres & Beatriz Vaca	(09/01/99 – 06/30/00)

LEARNING TOOLS

Blackboard, Wimba, Captivate, WiZIQ, Camtasia, Photoshop, Flash, DreamWeaver, Powerpoint, Prezi, Moodle, SecondLife, RealXtend, Matlab, Scilab, LabView, Marc/Mentat, Adams

FEATURED IN ARTICLES

“Digital Reality.” *SDSUniverse*. Monday, December 01, 2003

“Finite Element Analysis in Interdisciplinary Mechanics.” *Gather/Scatter*. San Diego SuperComputer Center, ISSN 0885-3878. June 1989. Vol.5, No. 6.

CHAired CONFERENCE SESSIONS

“Virtual Reality Applications in Engineering.” 12th Engineering Mechanics Conference. *Engineering Mechanics: A Force for the 21st Century*. ASCE Specialty Conference. May 17-20, 1998. San Diego Marriott. La Jolla. “Computers in Education”, Frontiers in Education Conference. San Diego, 2006

ORGANIZER, MODERATOR AND HOST OF SYMPOSIA AND WORKSHOPS

Symposium: Research in Mechanics and Cyber-Infrastructure

On July 26, 2006, Dr. Impelluso led a symposium at the 8th US National Congress on Computational Mechanics in Austin, Texas. This symposium, titled *Cyber-Infrastructure and Mechanics: A New Research Arena*, presented work by researchers in the US and abroad at national labs and research institutes. The focus was using the CI to solve multi-phase and coupled problems in mechanics and biomechanics for surgical simulations.

Symposium: Education

From June 8-10, 2006, close to 20 mechanical engineering professors from across the United States and abroad will attend San Diego State University's first-ever *Mechanical Engineering Curriculum Symposium, hosted by Drs. Impelluso* (Department of Mechanical Engineering) and *Bober* (Educational Technology). Funded by *Fund for the Improvement of Postsecondary Education* (FIPSE) <http://attila.sdsu.edu/me295/symposium>

Special Session ACET Education

“Disseminating a Methodology to Create Virtual Machines.” Association for Educational Communications and Technology, *2005 Intentional Convention: Exploring the Vision*. Orlando, Florida, 2005.

Workshop: Frontiers in Education

“Physically-Based Virtual Machines for Engineering Education.” *The Future – Impact on Engineering and Science Education, Frontiers in Education*. Reno, Nevada. 10/10, 2001.

Workshop: Frontiers in Education

“Virtual Machines: **Simulation-based Learning**”, San Diego, CA. 10/10, 2006. *Frontiers in Education Conference, 36th Annual Volume , Issue , 27-31 Oct. 2006* Page(s):1 – 3

INVITED PANELIST

Title: Meet the Universal Design for Learning (UDL) Scholars

Host: Disability & Diversity Project, Interwork Institute, December 4, 2009

INVITED PRESENTATIONS

“Mechanisms: A Foundation for Machines and Math. Center for Research in Math and Science Education. 6475 Alvarado Rd., #128, 12:30-1:30 PM Mar. 11.

“Real-Time Interaction: Education, Surgery, and Virtual Machines.” UNITED NATIONS: ARTS FOR PEACE CONFERENCE, United Nations, New York City. December 2, 2010.

“Current Technologies and Future of Education.” UNITED NATIONS: ARTS FOR PEACE CONFERENCE, United Nations, New York City. Friday, December 2, 2010.

“Biomimicry and Engineering”, UNITED NATIONS: ARTS FOR PEACE CONFERENCE, United Nations, New York City. Friday, December 2, 2010.

“Biomimicry and Sustainability”, Center for Regional Sustainability, SDSU, November, 12, 2010, San Diego.

“Capturing Course Content” Learning Without Boundaries Conference, The Course Design Institute, San Diego State University, May 28, 2009.

“Physics Based Virtual Reality.” University of Louisiana, Lafayette. November 18, 2005.
Louisiana Immersive Technologies Enterprise. Contact: Ramesh Kolluru,
kolluru@louisiana.edu

“Ernesto Boyer and a Model of Scholarship for the Information Age.” Georgia Institute of Technology, Savannah, Georgia. Department of Mechanical Engineering. December 3, 2005.
Contact: Dr. Farrokh Mistree, farrokh.mistree@me.gatech.edu

“Nonlinear Plane Tomoshenko-Beam Theory and an Eulerian Description.” Mitsubishi Electric Research Labs. Boston, Massachusetts. August 25, 1997. Contact: Dwight Meglan (dmeglan@mindspring.com)

“Mechanical Engineering and Virtual Reality: A Future Market.” Business Forum Day, Graduate Business Council, Colorado State University, Fort Collins. Business Day. February 8, 1997

COURSES CREATED OR REDESIGNED

ME101: Solid Modeling I
ME102: Solid Modeling II
ME203: Computer Programming Applications
ME205: Simulations of Machines
ME310: Machines and Mechanisms
ME610: Finite Element Methods
ME696: Multi-Body Dynamics

COURSES TAUGHT

Finite Element Methods: Linear, Elastic, Isotropic (SDSU, UCSD)
Non-Linear Finite Element Methods: Dynamic, Plastic, Large Deformation (SDSU)
Statics (UCSD)
Dynamics (UCSD)
Multi-Body Dynamics (SDSU)
Machines and Mechanisms (SDSU)
Computer Aided Design (SDSU)
Virtual Machines (SDSU)
C Programming (UCSD, SDSU)
FORTRAN Programming (UCSD)
Numerical Methods in Engineering (UCSD, SDSU)
Theory of Plates (UCSD)

ADVERTISING ON BEHALF OF SDSU

<http://www.wimba.com/community/casestudies.php#cs15>
http://www.ptc.com/WCMS/files/1996/en/1996en_file1.pdf

CURRICULAR DEVELOPMENT

Created new courses to teach mechanical engineering at its intersection with computer science. The premise is that students learn more when they *create*, rather than *use*, software. Students choose a machine, reproduce it as a three dimensional model, study the physics, write software to implement the physics, create a data acquisition program to control the machine, write the network software to distribute all codes and then write the software to visualize the machine in semi-immersive virtual reality: <http://attila.sdsu.edu/me205>.

INFORMAL EDITOR APPROVED PUBLICATIONS

“Crisis in Engineering Education” Editorial Opinion Section. The North Jersey Record, 11/27/06.

PEER REVIEWED SOFTWARE DEMONSTRATIONS:

Demonstration: Physics Based Virtual Reality with Tactile Force Feedback The I-WAY

Small Deformation Physics Based Virtual Reality: Created a platform in physics based virtual reality by coupling finite element method, high performance massively parallel computing using MPI, force-feedback haptics devices, and high performance virtual reality theater: I-DESK. Physically Based Virtual Reality". GII Testbed and HPC Challenge Demonstration Applications on the I-WAY." Eds. Korab, H., Brown, M. ACM/IEEE SC'95, 1995.

Demonstration: Physics Based Virtual Reality with Tactile Force Feedback HPCN '98

Large Deformation Distributed Physics Based Virtual Reality: Created a platform in physics based virtual reality by coupling large deformation finite element method, high performance massively parallel computing using native Cray Message Passing, force-feedback haptics devices, and high performance virtual reality theater: I-DESK + CAVE. *By invitation.*

Demonstration: SIGGRAPH: Education

Impelluso, T. "Physics Based-VR for Education." Program Guide ACM SIGGRAPH, Proceedings. July 27-August 1, 2003. Conference Floor Demonstration.

Demonstration: SIGGRAPH: Research

Impelluso, T. "Physics Based-VR for Research." Program Guide ACM SIGGRAPH, Proceedings. July 27-August 1, 2003. Conference Floor Demonstration.

Demonstration: For Mitsubishi Electric Research Labs (1997)

Developed a physics based virtual reality simulator to model minimally invasive cardiac catheterization. The 3D beam equations were solved with a finite element code that interpolated curvature using Frenet frame theory to accelerate the solution. Project was completed for Dwight Melan, manager, Mitsubishi Electric Research Labs, Boston Massachusetts.

Demonstration: Tensegrity Structures: (1996)

Developed a physics based virtual reality simulator to model tensegrity structures with force feedback. Users were able to deform a structure with force feedback joysticks, observe the tensegrity deformation and obtain tactile feedback. Structure solved using non-linear solution scheme forked by local server. Visualization with Open Inventor.

Demonstration: Wavelets for Edge Detection: (1993-4)

Developed a wavelet-based edge detection software system for Core Inc., Japan. Travelled to Japan twice (1993, 1994) to demonstrate this system and provide lectures on wavelet theory to be used in automating the detection of flaws in manufacture computer chips.

Commercial Development (after Ph.D., worked 4 years in industry)

Developed a turnkey near real-time seismic data acquisition and analysis package for Sun Microsystems, Inc., Computers, 1990-1993. Wrote and maintained record-based disk buffering and time-based disk buffering modules; implemented the system by using both shared memory Inter-Process Communication and BSD socket-based remote procedure calls.

BOOK CHAPTERS

Impelluso, T., and C. Negus. “Biomechanics and the Cyberinfrastructure: Delivering the Bone and Other Models to the Surgeon.” In *Tissue Modeling and Surgical Simulations*. Southampton, Boston: WIT Press, 2005.

Impelluso, T., and M. Bober. “Revitalizing the Mechanical Engineering Curriculum: Challenges and Rewards.” *Innovations 2005–World Innovations in Engineering Education and Research*. iNEER, 2005.

JOURNAL PUBLICATIONS

1. Impelluso, T., “Reforming Rigid Body Dynamics: Reducing Mechanical Engineering Student Attrition” (In Submission). *International Journal of Mechanical Engineering Education* 2017
2. Murakami, H., Rios, O., Impelluso, T. A Theoretical and Numerical Study of the Dzhanibekov and Tennis Racket Phenomena. *Journal of applied mechanics* 2016 ;Volume 83.
3. Harris, R., Impelluso, T. “Assessment of a Proposed Software Design for the Solution of Multi-Phase Mechanics Problems on Networked Laptops,” *Intelligent Information Management*, [Volume 2, Number 7 \(Jul. 2010\), pp. 391--436, Size: 8.68MB](#)
<http://www.scirp.org/journal/iim>
4. Impelluso, T. “Assessing Cognitive Load Theory to Improve Compute Programming Learning for Mechanical Engineers”, *American Journal of Distance Education*, Volume 23, Issue 4 October 2009 , pages 179 - 193
5. Impelluso, T. “Leveraging Cognitive Load Theory, Scaffolding, and Distance Technologies to Enhance Computer Programming for Non-Majors”, *Advances in Engineering Education*; Spring 2009, Volum 1, Number 4.
6. Negus, C, and Impelluso, T. “Continuum remodeling revisited Deformation rate driven functional adaptation using a hypoelastic constitutive law “Biomechanics and Modeling in Mechanobiology”, *PublisherSpringer Berlin / Heidelberg* ISSN1617-7959 (Print) 1617-7940 IssueVolume 6, Number 4 / July, 2007

7. Perez, A, Mahar, A, Negus, C, Newton P, Impelluso, T. "A Computational Evaluation of the Effect of Intramedullary Nail Material Properties on the Stabilization of Simulated Femoral Shaft Fractures." *Medical Engineering and Physics*, 30, 2008 pp 755-760
8. Harris, R, and Impelluso, T, "A Virtual Stress Testing Machine" *Engineering with Computers*, Springer-Verlag, pp 107-117, Vol. 4, Number 2, June, 2008
9. Impelluso, T., and M. Bober. "Revitalizing the Mechanical Engineering Curriculum: Challenges and Rewards." *Innovations 2005—World Innovations in Engineering Education and Research*. iNEER, 2005.
10. Impelluso, T. "A Proposed Cyber-Infrastructure to Solve Multi-Phase Problems in Mechanics for Physics Based Virtual Reality." *Journal of Computational Biomechanics*. April 2006, Vol 9, 2 pp . 109-120
11. Mahar, A., S. Lee, F. Lalonde, T. Impelluso, and P. Newton. "Biomechanical comparison of stainless steel and titanium nails for fixation of simulated femoral fractures." *Journal of Pediatric Orthopedics* (November/December 2004). Vol. 24, No. 6: pp. 638-641.
12. Impelluso, T. "A Density Distribution Algorithm for Bone Incorporating Local Orthotropy, Modal Analysis and Theories of Cellular Solids." *Computer Methods in Biomechanics and Biomedical Engineering* (June 2003). Vol. 6, No. 3: p. 217.
13. Cox, T., M. Kohn, and T. Impelluso. "Computerized Analysis of Resorbable Polymer Fasteners for the Rigid Fixation of Mandibula Angle Fractures." *The Journal of Oral and Maxillofacial Surgery* (April 2003). Vol. 30: pp. 481-486.
14. Murakami, H., and Impelluso, T. J., 1998, "Large-Deformation Analyses of Spatial Beams by Using Frenet's Moving Frame," *Proceedings of the 12th Engineering Mechanics Conference*, H. Murakami and J. E. Luco eds., La Jolla, California, May 17-20, ASME, Reston, VA.
15. Impelluso, T., and T. Metoyer-Guidry. "Virtual Reality and Learning by Design: Tools for Integrating Mechanical Engineering Concepts." *Journal of Engineering Education* (2001). Vol. 90, No. 4: pp. 527-534
16. Murakami, H., and T. Impelluso. "Wavelets for Image and Signal Processing." *Image Technology and Information Display* (November 1994). Vol. 26, No. 21.
17. Impelluso, T., and H. Murakami. "A Homogenized Continuum Model for Fiber-Reinforced Composites." *ZAMM* (1993). Vol. 75: pp. 171-188
18. Murakami, H., T. Impelluso, and G. Hegemier. "Development of a Mixture Model for Non-Linear Wave Propagation in Fiber-Reinforced Composites." *International Journal of Solids and Structures* (1992). Vol. 29: pp. 1919-1937.
19. Murakami, H., T. Impelluso, and G. Hegemier. "A Continuum Finite Element for Single-

Set Jointed Media." *International Journal for Numerical Methods in Engineering* (1991). Vol. 31: pp. 1169-1194.

20. Skalak, R., T. Impelluso, L. Soslowsky, E. Schmalzer, and S. Chien. "Theory of Filtration of Mixed Blood Suspensions." *Biorheology* (1987). Vol. 24: pp 35-52.
21. Skalak, R., T. Impelluso, E.A. Schmalzer, and S. Chien. "Theoretical Modeling of Filtration of Mixed Blood Suspension." *Biorheology* (1983). Vol. 24: pp. 41-56.
22. Chien, Shu, E.A. Schmalzer, M.M.L. Lee, T. Impelluso, and R. Skalak. "Role of White Blood Cells in Filtration of Blood Suspension." *Biorheology* (1983). Vol. 20: pp. 11-27.

CONFERENCE PROCEEDINGS

1. Murakami, H., Rios, O. Impelluso, T., "A Study of the Dzhanibekov Phenomena. International Mechanical Engineering and Exposition 2016; 2016-11-13 - 2016-11-17
2. Impelluso, T., Rigid Body Dynamics: A New Philosophy, Math and Pedagogy. International Mechanical Engineering and Exposition; 2016-11-11 - 2016-11-17
3. Murakami, H., Rios, O. Impelluso, T., A numerical study of the dzhanibekov and tennis racket phenomena. International Mechanical Engineering and Exposition 2015; 2015-11-13 - 2015-11-19.
4. Impelluso, T, and Rizzo, John. "Saving Tens of Thousands of Dollars with Wimba while Improving Teaching" presented at the Wimba Connect Users Conference, Scottsdale Arizona, April 2009
5. Impelluso, T. "Distance Learning and Cognitive Load Theory to Enhance Computer Programming for Mechanical Engineers: Qualitative Assessment." Pacific SouthWest Section of the American Society of Engineernig Education, 2009 Annual Conference, San Diego, California
6. Impelluso, T. "Cognitive Load Theory as a tool to underird and validate distance learning." American Society of Engineernig Education, 2009 Annual Conference, Austin Texas.
7. Oka, R., A. Mahar, and T. Impelluso. "A Computational Approach to Orthopedic Implant Design Optimization." Computational Biomechanics Symposium. Chicago, Illinois. February 20, 2006.
8. Bober, M., and T. Impelluso. "Disseminating a Methodology to Create Virtual Machines." Association for Educational Communications and Technology, 2005 International Convention: Exploring the Vision. Orlando, Florida, 2005.

9. Bober, M., and T. Impelluso. "Mechanics and the Cyber-Infrastructure: Assessment of a New Curriculum." 8th US Congress on Computational Mechanics. Austin, Texas. July 24-28, 2005.
10. Harris, R., and T. Impelluso. "Solutions to Coupled Problems in Mechanics Using the CyberInfrastructure." 8th US Congress on Computational Mechanics. Austin, Texas. July 24-28, 2005.
11. Negus, C., T. Impelluso. "An Approach to Bone Modeling Using the Cyber-Infrastructure." 8th Congress on Computational Mechanics. Austin, Texas. July, 2005.
12. Impelluso, T. "A Cyber Infrastructure to Support Physics Based Organ Geometries for Surgical Planning." Medicine Meets Virtual Reality 13. Long Beach, California. January 26-29, 2005. (This presentation won 2nd place in the review.)
13. Impelluso, T., and M. Bober. "Revitalizing the Mechanical Engineering Curriculum: Challenges and Rewards." International Conference on Engineering Education. Gainesville, Florida. October 17-22, 2004.
14. Harris, R., A. M. Ausin, J. S. Angulo, F. Valafar, and T. Impelluso. "VSTM: Virtual Stress Testing Machine." The 2004 International Conference on Parallel and Distributed Processing Techniques and Applications. Las Vegas, Nevada. June 21-24, 2004.
15. Valafar, F., R. Harris, A. M. Ausin, J. S. Angulo, and T. Impelluso. "Scalability of VSTM: A Memory Model and Inter-Processor Communication Perspective." The 2004 International Conference on Parallel and Distributed Processing Techniques and Applications. Las Vegas, Nevada. June 21-24, 2004.
16. Impelluso, T. "Network Protocols for Physics Based Simulations." SDSU Computational Science Research Center. San Diego, California. March 12, 2004.
17. Impelluso, T., and M. Bober. "Virtual Machines." Poster Presentation. FIPSE Annual Project Directors Meeting. Washington, D.C. November 4-6, 03.
18. Impelluso, T. "Physics Based-VR for Education." Program Guide ACM SIGGRAPH, Proceedings. San Diego, California. July 27-August 1, 2003 (conference floor demonstration).
19. Impelluso, T., and G. Lee. "A Wavelet-Based Fuzzy Neural Inference Face Recognition Classifier to Detect Potential Terrorist Attacks." CAINE Conference. Washington, DC. November 6, 2002.
20. Impelluso, T. "Locally Orthotropic Femur Remodelling." American Society of Biomechanics. La Jolla, California. August 10-11, 2001.
21. Selgas, C, B. Vallejo, A. Mahar, and T. Impelluso. "Bone Remodeling Characteristics for

- Two Types of Femoral Fixation Using Finite element Analysis." International Society of Biomechanics. July 8-13, 2001. Zurich, Switzerland.
22. Vallejo, B, C. Selgas, A. Mahar, and T. Impelluso. "Using Modal Analysis to Determine Failure Characteristics of Remodeled Bone in a Fractured Femur Model." International Society of Biomechanics. July 8-13, 2001. Zurich, Switzerland.
 23. Impelluso, T. "A Density Distributing Locally Orthotropic 2-D Femur Remodeling Algorithm." International Society of Bioengineers. Schlieren, Switzerland. July 8-10, 2001.
 24. Impelluso, T. and G. Lee. "Integrating Engineering and Science Analysis and Design Concepts Using Virtual Systems." Proceedings of the ISCA International Conference On Intelligent Systems. Washington, D.C. June 2001.
 25. Impelluso, T. "Physics Based Virtual Machines." ASEE/IEEE Frontiers in Education Conference. Reno, Nevada. 2001.
 26. Impelluso, T., and T. Metoyer. "Virtual Reality and Learning by Design: Tools for Integrating Mechanical Engineering Concepts." ASEE/IEEE Frontiers in Education Conference. Kansas City, Missouri. 2000.
 27. viewed proceedings). Impelluso, T.J. "Physically-based Virtual Reality: Integrating FEM and Visualization." 12th ASCE Engineering Mechanics Conference Proceedings. University of California at San Diego. La Jolla, California. May 17-20, 1998.
 28. Murakami, H., Y. Nishimura, T. J. Impelluso, and R. E. Skelton. "A Virtual Reality-Based CAD System for Tensegrity Structures." 12th ASCE Engineering Mechanics Conference Proceedings. University of California at San Diego. La Jolla, California. May 17-20, 1998.
 29. Murakami, H., and T. J. Impelluso. "Large-Deformation Analyses of Spatial Beams by Using Frenet's Moving Frame." 12th ASCE Engineering Mechanics Conference Proceedings. University of California at San Diego. La Jolla, California. May 17-20, 1998.
 30. Impelluso, T. "Distributed, Physically Based-VR with Tactile Feedback." Program Guide ACM SIGGRAPH, Proceedings. August 4-9, 1996 (pp. 55).
 31. Impelluso, T. "Physically-based Virtual Reality." GII Testbed and HPC Challenge Applications on the I-WAY. Holly Koram and M. Brown, editors. ACM, IEEE, 1995.
 32. Impelluso, T., and H. Murakami. "A Damage Model for Laminated Composites." 2nd US Congress on Proceeding Computational Mechanics. Washington, D.C., University of Virginia. August 16-18, 1993.
 33. Murakami, H., and T. Impelluso. "High Order Computational Model for Fiber Reinforced Composites in Enhancing Analysis for Composite Materials." Proceedings of

Winter Meeting of ASME. Atlanta, Georgia. L. Schwer and J.N. Reddy, editors.
ASME: New York. Vol. 10. December 1-6, 1991.

34. Impelluso, T., H. Murakami, and G.A. Hegemier. "A Mixture Finite Element for Fiber Reinforced Composites." Proceedings of the 11th US National Congress of Applied Mechanics. Tucson, Arizona. May 21-25, 1990.
35. Impelluso, T., H. Murakami, and G.A. Hegemier. "A Continuous Finite Element for Single-Set Jointed Media." Proceedings of the 12th Canadian Conference of Applied Mechanics. TP5. May 28, 1989 (pp. 804-805).

REPORTS

DARPA Final Report W81XWH-04-2-0010: Supporting the Virtual Soldier with a Physics Based Virtual Reality Client/Server Software System. Submitted as per grant requirement: June 27,2005 to Pawlus, Judy K Ms USAMRMC.

Misubishi Electric Research Labs: Surgical Simulations, Boston Massachusetts, February, 1998, Dwight Meglan

"Reduced Nerve Blood in Edematous Neuropathies: Deformatio and Flow Analyses." Murakami and Impelluso. Robert Myers, UCSD VA Hospital.

"A Distance Learning Curriculum in Simulation Science," University of Phoenix, 12/15/07

"Simulation Science," Qualcomm Proposal.

"San Diego Engineering Discovery Center," Delivered to Burnham Real Estate, 9/1/07.

THESIS AND DISSERTATION SUPERVISION

Theses and Projects

Richard Oka **Ph.D.** **CURRENT** **Chair**

Dissertation Title: Tentative: Dynamics and Cartan's Forms

To reformulate dynamics using theory of forms.

Richard has been accepted into the program and is prepared to take DQE in Spring '09

David Sims **Ph.D.** **CURRENT** **Chair**

Dissertation Title: Tentative: Synthetic Muscle Modeling

To invert the FE method and convert it into a synthetic tool to create virtual muscle; clinical assessment.

David will apply to the JDP this academic year.

Charles Negus **Ph.D.** **2005** **Chair**

Dissertation Title: "Dynamic Bone Remodeling using a Hypo-elastic Formulation."

Developed and assessed a new computational method for bone remodeling and re-growth.

Scott Arthur Gasner Ph.D. 2006 Advisor

Dissertation Title: “Cellular Pattern Formation and Noise in O(2) Symmetric Systems.

Particular pattern formations in behaviors that could be mathematically categorized as possessing orthogonal symmetry and applied to the problem of flame fronts.

M .S.

Julio Alonso M.S. 2009

Thesis Title: “An XML Based Framework for Thermodynamic Application”

This involved use of web-based software for analysis of thermal systems.

Richard Harris M.S. 2006 Chair

Thesis Title: “Integrating Mechanics Using the Cyber-Infrastructure.”

This work developed a software platform to integrate two distinct modules of computational mechanics: multi-body dynamics and finite element methods.

Richard Oka M.S. 2006 Chair

Thesis Title: “Stablization of Spinal Defects”

This work assessed mechanical methods to stabilize the spin after surgery by conducting an FE analysis on the vertebrae.

Charles Lam: M.S. 2006 Advisor

Thesis Title: “A Constitutive Law for Aortic Valve Tissue”

This work developed a constitutive law for the aortic valve.

Dina Abulon: M.S . 2006 Advisor

Thesis Title: “Morphology and Tissue Characterization of Fusion in Aortic Heart Valves Excised from LVAD patients”

This work studied the impact of left ventricular assist devices on the material properties of the aortic valve.

Vikas Sharma M.S. 2005 Chair

Thesis Title: “A Finite Element Based Analysis of New Total Ankle Arthroplasty Implant Using Function Anatomical Positions and Joint Loading.”

This work modeled a new type of ankle implant

Eric Peterson M.S. 2005 Advisor

Thesis Title: “Interactive Field Geology to Interpret the Neogene Tectono-Stratigraphic Evolution of the Kendeng and Rembang Deformed Zones.”

This work integrated mapping in the jungles of Indonesia along the major strike slip fault zones

that run the length of the island of Java Thesis also used field mapping with computers to link remote sensing imagery, field measurements, and server connection to map area as large as southern California in one field season

Angel Perez **M.S.** **2004** **Chair**
Thesis Title: “Biomechanical Comparison within a Finite Element Model of Stainless Steel and Titanium Flexible Intramedullary Nails for Stabilization of a Fractured Femur.”

This work studied the impact of medullary nails and assessed whether less stiff nails can be more effective in carrying loads during femur fixation.

Michelle Marks: **M.S.** **2001** **Advisor**
Thesis Title: “Static and Dynamic Sagittal Spinal Balance in Normal Subjects.”

This study evaluated the static and dynamic sagittal spinal balance in normal subjects utilizing a motion analysis laboratory.

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PROPOSALS FUNDED:

Multi-Phase Mechanics

Agency: NSF **Amount:** \$124,550 **Duration:** 11-05/11/06
Summary: Extend a platform for solution of multi-phase problems by incorporating non-linear interaction and contact.

Metal Forming

Agency: POSCO Korea **Amount:** \$42,000 **Duration:** 10/03-5/04.
Summary: Metal forming analysis using MSC software.

Ankle Modeling

Agency: Kinetikos Medical, Inc. **Amount:** \$25,000 **Duration:** 10/03-/04
Summary: FE analysis of ankle implants.

Virtual Soldier Project

Agency: DARPA **Amount:** \$200,000 **Duration:** 10/03-3/05
Summary: Development of platform to solve problems of flexible linkages using technologies of the cyber-infrastructure.

ITR: A Virtual Stress Testing Machine

Agency: NSF **Amount:** \$300,000 **Duration:** 9/02-0/05

Summary: This project tested network communication and inter-process communication to integrated the modules of mechanics and deliver them to physics based virtual environments.

Dissemination of a New Mechanical Engineering Curriculum

Agency: FIPSE **Amount:** \$\$370,000 **Duration:** 9/02-9/05

Summary: This project funded the evolution and dissemination of a method to teach mechanical engineering at its intersection with computer science.

SGER: Femur Adaptation in a Smart Surgical Ward

Agency: NSF **Amount:** \$33,000 **Duration:** 5/02-5/03

Summary: This project funded the proof of concept studies of a method to model bone remodeling and trabecular re-orientation.

SDSU Grant in Aid

Amount: \$1,500 **Duration:** 1999-2000

Summary: This funded student travel for the Bioresorbable Resins project.

Curricular Reform in Mechanical Engineering

Agency: TRW, Inc. **Amount:** \$15,000 **Duration:** 09/01-09/02

Continuation Grant (see below)

Curricular Reform in Mechanical Engineering

Agency: TRW, Inc. **Amount:** \$20,000 **Duration:** 09/00-09/01

Continuation grant (see below)

Modeling BioResorbable Resins

Agency: Macropore, Inc. **Amount:** \$24,000 **Duration:** 01/00-01/02

Summary: This project assessed bio-resorbable resins and their use in fixation of femoral fractures.

Curricular Reform in Mechanical Engineering

Agency: TRW, Inc. **Amount:** \$20,000 **Duration:** 09/99-09/00

Summary: This project funded the development of four new classes at SDSU.

Simulations of Vehicle Re-entry

Agency: Calspace **Amount:** \$10,000 **Duration:** 1/99-6/99

Summary: This project was a student led effort to create a simulation to retrieve satellites during descent.

Technology Integration for Physics Based Virtual Reality

Agency: NSF **Amount:** \$50,000 **Duration:** 1/97-1/98

Summary: This project assessed network traffic configurations for the previous project.

A Study Toward the Feasibility of Using MPI as a Message Passing Interface to Embed the Finite Element Methodology in a Distributed Environment

Agency: NSF **Amount:** \$24,805 **Duration:** 9/95-9/96

Summary: This project assessed the use of MPI as opposed to native Cray message passing.

Physics Based Virtual Reality: Coupling Finite Element Methods to a CAVE in a Massively Parallel Environment

Agency: DARPA **Amount:** \$50,000 **Duration:** 9/95-9/96

Continuation Funding (see below)

Physics Based Virtual Reality: Coupling Finite Element Methods to a CAVE in a Massively Parallel Environment

Agency: DARPA **Amount:** \$50,000 **Duration:** 9/95-9/96.

Summary: This project coupled a haptic device, a CAVE, and a parallelized finite element code.