ACADEMIC VITAE

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AREAS OF INTEREST

Computer Graphics, Complex Systems, Human-Computer Interaction, Wearable Computing and Virtual Reality, Haptic and Aroma Applications, Medical Applications, Human Animation and Avatars, Volume Rendering and Visualization, Realistic Images, Ray Tracing, Computational Geometry.

PRESS/INTERNET COVERAGE

Research on Mobility Maps training for the Visually Impaired and the Blind, Gazette, Colorado Springs, May 18, 2000, http://www.highbeam.com/doc/1P2-5950104.html

Crossover Applications Conference, May 15, 2010 Coverage: Communique UCCS, June 16, 2010, http://communique.uccs.edu/?p=1193

CoView Data Labs UCCS Initiative aims to Engineer Funds: November 19, 2011: http://www.gazette.com/articles/initiative-128785-jobs-colorado.html

CoView Data Lab mentioned in Tech News: http://www.technologytransfertactics.com/content/2011/11/23/uccs-initiative-aims-to-engineer-funds-businesses-jobs/

PROFESSIONAL EXPERIENCE

August 2000-to-date: Professor (tenured), Department of Computer Science, University of Colorado, Colorado Springs, Colorado, USA.

January 2002 - Summer 2002: Interim Chair, Department of Computer Science, University of Colorado, Colorado Springs, Colorado.

August 1994-August 2000: Associate Professor (tenured), Department of Computer Science, University of Colorado, Colorado Springs, Colorado.

August 1987-August 1994: Assistant Professor, Department of Computer Science, University of Colorado, Colorado Springs, Colorado.

Consultant to ACGE Inc., on voice recognition/ Unity3D efforts. Worked with Dr. Tony Beld, Colorado Springs, 8/2010-8/2011.

Summer Research (2011) Worked on Medical Haptics/GPUs research project with Dr. Karl Reinig (Touch of Life, TOC).

Summer Research (2002 &2003) on Wearable Computing and Medical Applications; July-August 2003. Worked with Dr. N Hagita (Department Head); July 2002, and Dr. Kenji Mase (Department Head), Advanced Telecommunication Research (ATR) Lab, Soraku-Gun, Kyoto, Japan.

Summer Research (1997, 1998 & 1999): Worked on Unencumbered (video-based) virtual environments and tracking research with Dr Jun Ohya and Dr. R. Nakatsu,, at the Media Integration and Communication (MIC) Research Laboratory, Advanced Telecommunication Research (ATR), Soraku-Gun, Kyoto, Japan.

June 1995-October 1995: Closed Form Solution for Inverse Kinematic Chain. Worked with Dr Sharon Stansfield at the Virtual Reality/Intelligent Simulation (VR/IS) Laboratory, Sandia National Laboratory, Albuquerque, NM from during Faculty Sabbatical. Research supported by the Department of Energy grant, under Contract DE-ACO4-94AL85000.

September 1991-August 1992: Invited visiting researcher at Central Research Laboratory, Matsushita Electric Industrial Co Ltd, Osaka, Japan. Sponsored by The Government of Japan (Japan Key Technology Scholar) and Matsushita. Human Animation. On one year leave from the University of Colorado.

August 1984-August 1987: Graduate Teaching and Research Assistant, Department of Computer Science, University of Central Florida, Orlando; February 1984-May 1984: Laboratory assistant in Electrical Engineering Department, University of Central Florida, Orlando; August 1982-December 1983: Graduate Research Assistant for the CIAD (Communication and Interactive Access to spatially distributed Databases) Project at the Department of Computing Science, University of Alberta, Edmonton; August 1981-December 1983: Graduate Teaching Assistant at the Department of Computing Science, University of Alberta, Edmonton.

August 1980-June 1981: Associate Software Engineer, R&D Section, DCM Data Products, New Delhi, India.

EDUCATION

Summer 1987: Ph.D in Computer Science, University of Central Florida, Orlando, Florida. Dissertation: *The Slicing Extent Technique for Fast Ray Tracing*. Dissertation Advisor: Dr. J. Michael Moshell.

Spring 1984: M.Sc in Computing Science, Department of Computing Science, University of Alberta, Edmonton, Canada. Thesis: *Data Structures for Spatial Information*. Thesis Advisor: Dr. Wayne A. Davis.

June 1980: B.E. in Electronics and Communication Engineering, Indian Institute of Technology (IIT) Roorkee (formerly University of Roorkee, Roorkee), U.P., India. Project: *Data Communication through Telephones Lines and Interfacing with a Computer*. Project Advisor: Dr. Harpreet Singh.

FUNDING, PATENTS, SCHOLARSHIPS AND RESEARCH SUPPORT

Consulting on ISLET Project with ACGE, ONR, September 2010-June 2012, 1/6th Consulting and student support estimated at $30,000 with ACGE on ISLET (Integrated System for Language Education and Training) through ONR. ISLET, an $8.4 Million ONR funded project, awarded to ACGE ended in 2011. The student support estimated at project supported a GMI student Nick Sterling (approximately 20 hrs/wk, $40/hr between June 2010-August 2011).

Research Project with ToL (Touch of Life), haptics medical application on GPU, Research project, Summer 2011 ($10,307) supported PhD student John Magby who was hired by ToL at the end of the grant period.

CoView Data Lab™ with University of Arkansas, Little Rock (UALR), Private Donation ($5000) for each University. Two students (Bill Fitzpatrick, and James Caban-Tomski) were supported Summer 2011. CoView Data Lab™ interaction (Gazette telegraph: http://www.gazette.com/articles/initiative-128785-jobs-colorado.html).

Aroma application Equipment and software support for Graphics, VR and GMI Courses – EAS IT fee, Fall 2008, BioPac sense of smell device (approx. $4200).

TNUA-UCCS-Denver Children Hosptial Project, TNUA—Taiwan ($12000), EFW2 (Earth, Fire, Water and Wind) classification; motion capture animation (PI: Professor Ed Chow)(2007-08).

UCCS-DMNS (Denver Museum Dome Project) ($12,000) Dec 2008-June 2009. CS/GMI students work with Denver Museum's vPresent openSource software.

Equipment and Software Support for Graphics, VR courses --- EAS Instructional Fee, June 2007, $3,500.00, PI of the proposal for updating lab equipment and acquiring support for the Games, Media Convergence and Integration Lab. Point Grey Research camera system purchased and used in Fall 2007 classes.

Equipment and Software Support for Graphics, VR courses --- EAS Instructional Fee, June 2006, $15,500.00, PI of the proposal for updating lab equipment and acquiring support for the Games, Media Convergence and Integration Lab.

Game Design and Development Interdisciplinary Lab, Intel (POC -- Judy Cara), 2006, $40,000.00, PI for the $40,000 grant. Several computers (ENG 140) and software such as Maya, ClayTools, and animation software was acquired for Graphics, VR (GMI) related courses and GMI degree program; graphics and VR lab updated.

Animation-Celebration Course funded by D-11 School District. D11-UCCS Pilot-program with District Schools offered June 16-27, 2003 to ten sixth graders from D-11 ($2,340).

Summer support (approximately $10,000) Advanced Telecommunication Research Lab International, Kyoto, Japan, Summer 2003 Worked in the area of medical wearable computing applications.

Haptic Jackets and Wearable Visual Displays for the Secure Global Share System (funded) $12,000, NISSC-AFOSR supported grant (Summer 2003)

Mobile-Plates Wearable Computer and Haptic-Imprints (funded) $13,000, NISSC-AFOSR supported Grant (Fall 2003).

Collage-of-Images: An Augmented Reality Wearable System for Simultaneous Sharing of Secure Information using Simple Images, (funded) $5,000, NISSC-AFOSR supported grant (Spring 2004).

PI for RDC, EAS, UCCS Grant $3,500 for supporting a student in the Wearable Computing Lab for Spring 2003. Supported Sean Pedersen.

ElPomar Research Scholarship awarded to support a PhD graduate student (Richard Doyle) $20,000/year (Richard Doyle received his PhD in 2008).

Summer support (approximately $10,000 in Yen) Advanced Telecommunication Research Lab International, Kyoto, Japan, Summer 2002 Worked in the area of Wearable Computing (Toy Interfaces with Dr Kenji Mase).

Intel Grant ($50,000) to Department of Computer Science through CU Foundation (Ms. Maurine Dijani), with Dr Peter Gorder of MAE (Spring 2002).

Arranged one year full-support for David Norman at ATR, Japan (April 2003-March2004). The student conducted state of the art research at ATR, a world renowned research lab considered the premier research laboratory in Japan (estimated at $40,000-$50,000 including support for housing etc).

Nov-Verbal Information Processing Consortium Support (2000-2001): Organized first meeting of Non-Verbal Information Processing supported by ATR, Media Integration and Research Laboratory, Kyoto, Japan. The consortium members were professors from CMU, U of

Pittsburgh, U of British Columbia, Seikei University, U. of Illinois, Chicago, U College, Dublin, and my University. This first meeting of this consortium was held on Jan 30th and 31st, 1999, at the University of Colorado, Colorado Springs. Funding of 2Million Yen (approximately $18,000 in 2000-2001) provided to Dr. Semwal from ATR for organizing the conference.

Japanese Patent, Scan&Track Virtual Environment, (ATR/University of Colorado, Colorado Springs), June 1998.

Japan Key Technology Scholarship: approx $75,000 (Converted from Yen). Sponsored by The Government of Japan (Japan Key Technology Scholarship) and Matsushita Electric Industrial Co Ltd, Osaka, Japan. (September 1991 - August 1992). Matsushita also supported my student Douglas Dow for three years in Osaka approximated at $150,000.

Summer Research Support: estimated at $42,000 at the Advanced Telecommunication Research (ATR) Multi-Media and Integration Research Laboratory, Kyoto, Japan 619-02 (May 99-August 99).

Summer Research Support: estimated at $40,000 at the Advanced Telecommunication Research (ATR) Multi-Media and Integration Research Laboratory, Kyoto, Japan 619-02 (May 98-August 98).

Summer Research Support: estimated at $30,000 at the Advanced Telecommunication Research (ATR) Multi-Media and Integration Research Laboratory, Kyoto, Japan 619-02 (May 97-August 97).

Sabbatical Summer Support: $20,000 at the Virtual Reality/Intelligent Simulation (VR/IS) Laboratory, Sandia National Laboratory, Albuquerque, NM., Department of Energy grant Contract DE-ACO4-94AL85000 (June 1995 - October 1995).

IBM-UCCS-Redwood (ROLM) Project: $46,902.00. Designing a User Interface for Phones. (November 1988 to September 1989). Two Silicon Graphics IRIS Indigo systems were also acquired.

Small Grants Total: $32,200. 360Studio ($1600) 2008; CRCW, UCCS in house grant: $5000, Applying Virtual Reality for Mobility Training of Visually Impaired Person using the PHANToM force feedback device (1997); Engineering and Applied Science, Grigsby Trust Fund: $2600, the Enclosing Net Algorithm for Volume Rendering: Applying Virtual Reality to Medical Imaging (1997); Colorado Campus Contact Grant for $2,000 towards purchase of PHANToM force feedback device; CRCW, UCCS in house grant: $5000, Tele-Training: Applying Virtual Reality for Training Premier (Olympic) Athletes by Simulating Air Flow around a Cyclist. Summer Support (1994); Olympic Training Center, Colorado Springs: $5000, Science and Technology Grant, S93-036-A-CY with Professor Edmund R Burke, Associate Professor, Biology Department, University of Colorado, Animating the Cycling Motion of Premier Athletes in the Olympic Cycling Team (1993); Engineering and Applied Science, Grigsby Trust Fund: $2500, Interactive surgery (1990); Engineering and Applied Science, Grigsby Trust Fund: $3500, Controlling Fractals (1989); CRCW, UCCS in house grant: $2500,

Neural Nets and Universal Parallel Systems (1989). Software donation of ACIS Geometric Modeler from Spatial Technology Inc., Boulder, Colorado for one SGI system $2500 (1993).

Activities as Chair of CS Department

As the Interim Chair (Spring and part of Summer 2002): organized departmental meetings; managed the budget for academic year; negotiated three El-Pomar research assistantships for the department; worked on PhD options for the department; resolved Department Infrastructure issues and lab equipment purchases; wrote the Intel Grant (awarded $50,000); Chaired the Search Committee and hired one new faculty from over 80. Member: EAS Promotions and Tenure Committee (2002); Member: Dean Search Committee (2002). Organized Vision2009 an exclusive one-day meeting of CS faculty on department issues; Nominated best Teacher (Dr. Richard Wiener) and best Employee (Ms. Rhea Taylor) for EAS awards; Nominated CS Department for Unit-Merit Excellence Awards. Member: Graduate Committee (2001-2002). Prepared course assignments for Summer 2002, 2003 (preliminary), and for Fall 2002, and Spring 2003 classes (preliminary) semesters.

Graduate Program Coordinator -- Masters of Science in Computer Science, Focus: Media Convergence, Games and Media Integration or the *GMI Program. 2007-today.*

Wrote the proposal for the new degree program; the process of approval took almost two years. CU Chancellor approved the GMI degree program in the Summer 2007. First student graduated soon after that. This interdisciplinary Computer Science graduate degree program provides a valuable option for students who are seeking challenges at the graduate level in Media Convergence, Games and Media Integration specifically anchored through the area of HCI/VR, Graphics, Complex Systems, Animation, Visualization, 3D Games, and emphasis on both theoretical and practical computer science, perception, emergence, presence, and interaction. Nine students are enrolled in this program as of July 2014.

Director, University. (July 2016 - Present).

Director of UCCS Honors Program since Summer 2016. New Honors program called UCCS Chancellors Honors Program for cohort 2017 created. In addition, there are two programs called Mountain Lion Honors and University Honors with a total of 300+ students who will graduate in next three years as these two programs are phased in next three years. Faculty meetings with nine-faculty members. Teaching Gray Matters for since 2014 in the Honors Program. Established student advisory board. Represented Honors Program CUE committee, All Deans Council. Web-site of Honors Program modified/updated.

PUBLICATIONS

TRANSACTION PAPERS

1. Ryan Thomas and Sudhanshu Semwal. "Dynamic Proximity Clouds on the GPU" Transactions of Engineering Technologies, World Congress on Engineering and Computer Science 2014. Volume contains 39 revised and extended research articles of approximately 300 papers accepted at the conference, Editors Haend Kon Kim, Mahyar A. Amouzegar, and Sio-Long Ao, pp. 289-300, Springer Science+Business Media Dordrecht 2015, ISBN 978-94-017-7235-8 (September 2015) (Significant paper).

JOURNAL PUBLICATIONS REFEREED

2. SK Semwal, David Bolt, Resolved Motion Control for High Degree of Freedom Articulated Figures, Vol 26, Issue 4, 2006 of the International Journal of Modeling and Simulation, pp. 309-316 (2006).
3. Sudhanshu Kumar Semwal and Jun Ohya. Spatial Filtering using the Active-Space Indexing Method, in the Graphical Models and Image Processing, Academic Press journal, vol 63, pp 135-150 (2001).
4. Iris Fermin, Sudhanshu Semwal, and Jun Ohya, Indexing Method for Three-dimensional Position Estimation, in the IEICE Transactions on Information and Systems journal, vol E82-D, No 12, pp 1597-1604 (1999).
5. Sudhanshu Kumar Semwal and Michael J. Parker, Biomechanical Analysis, Animation and Visualization of the Leg Movements of the Olympic Cyclists, in the Real Time Imaging journal, Academic Press, vol 5, 109-123 (1999).
6. Sudhanshu Kumar Semwal, Ron Hightower, and Sharon Stansfield, Constant Time Mapping Algorithms for Real-Time Control of an Avatar using Eight Sensors, PRESENCE journal, vol. 6, no 1, pp. 1-21, MIT Press (January 1998).
7. Sudhanshu Kumar Semwal and Paul Gene Swann, Linear and B-Spline Interpolation for Ray Casting the Flow Visualization Data, the Journal of Visualization and Computer Animation, vol. 6, no 1, pp. 33-47, John Wiley & Sons, Inc. (1995).
8. Sudhanshu Kumar Semwal, and Brian Barnhart Ray Casting and the Enclosing Net Algorithm for Extracting Shapes from Volume Data, the special issue on Virtual Reality and Medicine for the Journal of Computers in Biology and Medicine, vol 25, no 2, pp. 261-276, (November 1994).
9. Sudhanshu Kumar Semwal, J. Karl Armstrong, Douglas E. Dow, and Fumio E. Maehara. Multi-Mouth Surfaces for Synthetic Actor Animation, the Visual Computer: An International Journal of Computer Graphics, Springer Verlag, vol 10, no 7, pp 388-406 (1994).
10. Sudhanshu Kumar Semwal and John J. Halleuer, Biomechanical Modeling: Implementing Line-of-Action Algorithm for Human Muscles and Bones using Generalized Cylinders, in Computers and Graphics: An International Journal, Vol 18, No 1, pp. 105-112, Jose L. Encarnacao (Editor-in-Chief), Pergamon Press (1994).
11. Sudhanshu Kumar Semwal, Charulata K. Kearney, and J. Mike Moshell, The Slicing Extent Technique for Ray Tracing: Isolating Sparse and Dense Areas, IFIP Transactions, vol. B-9, pp. 115-122 (1993). S.P. Mudur and S.N. Patnaik (Editors),

Elsevier Science Publishers B.V. (North Holland). Also published in The International Conference on Computer Graphics, Bombay, India (1993).

12. Sudhanshu Kumar Semwal, A Proposal for using ANNs for CG Animation, CC-AI: The Journal for the Integrated Study of Artificial Intelligence, Cognitive Science and Applied Epistemology, vol. 10, No. 1-2, pp. 93-106, 1993. New Trends on Neural Networks Symposium, Belgium 1992. F. Vandamme (Editor) (1993).

REFEREED CONFERENCE PUBLICATIONS

14 Wood, P. (Graduate), Semwal, S. K. (2016). *An Algorithmic Approach to Music Retrieval by Emotion based on Feature Data* (pp. 6). San Francisco, CA: Future Technology Conference FTC 2016 IEEE Technically Sponsored. http://www.ieee.org/conferences_events/conferences/conferencedetails/index.html?Conf_ID=38997.

15 Larsen, S. L. (Graduate), Semwal, S. K. (2016). *Creating 3D Avatars from Artistic Drawing for VR and Games* (pp. 6). San Francisco, CA: Future Technology Conference FTC 2016 IEEE Tecnhically Sponsored. http://www.ieee.org/conferences_events/conferences/conferencedetails/index.html?Conf_ID=38997.

16 Wilke, B. (Graduate), Semwal, S. K. (in press). *Generative Animation using a Physics Engine and Motion Capture Data* (pp. 6). Porto, Portugal: In Proceedings of the 12th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications – volume 1: GRAPP, 250-257, Porto, Portugal2017. http://www.grapp.visigrapp.org/.

17 Malec, C. (Graduate), Semwal, S. K. (2016). *Encriching Play Experience across Multiple Platforms* (pp. 6). Orlando, FL,: 2016 International Conference on Collaborative Technologies and Systems (CTS2016). http://cts2016.cisedu.info/6-participants/author-s-info.

18 Lawson, J. (Graduate), Semwal, S. K. (2016). *Problem Solving in an underwater Game Envioronment using Fear and Anxiety* (pp. 8). Palma, Mallorca: Conference on Articulated Motion and Deformable Objects (AMDO 2016). http://amdo2016.uib.es/index.php/2016/07/22/amdo-2016/.

19 George Mudrak and Sudhanshu Kumar Semwal, Group Aggression and Bullying through Complex Systems Agent Based Modeling, Annual Review of CyberTherapy and Telemedicine, Vol. 14, ISBN 1554-8716, pp. 189-194, 2016.

20 William Fitzpatrick and Sudhanshu Kumar Semwal, Interactive 3D Sound Generation, accepted for publication at the IASTED conference on Software Engineering and Applications (SEA 2015), paper number 829-008, pp. 1-5, October 26-27, 2015, Marina del Rey, USA.

21 Pam Wood and Sudhanshu Kumar Semwal, Connecting Music Signal Data to Perceived Emotions, Eleventh International Symposium on Computer Music Multidisciplinary Research, Plymouth, UK, 16-19 June, 2015.

22 George Mudrak and Sudhanshu Kumar Semwal, Modeling Aggression and Bullying: A Complex Systems Approach, Annual Review of Cybertherapy and Telemedicine 2015, B.K. Wiederhold et al. (Eds), pp. 187-191, IOS Press, 2015. Also presented at the 20th Annual CyberPsychology, CyberTherapy; Social Networking Conference (CYPSY2015), SanDiego, CA.

23 Sudhanshu Kumar Semwal, CTS Tutorial V: Complexity in Collaborative Environments, The 2015 International Conference on Collaboration Technologies and Systems (CTS 2015) in technical collaboration with the ACM, IEEE, and IFIP, Slides 1-80 (available on request) 15:40-17:50 p.m., June 1, 2015.

24 Hans Frederick Cox and Sudhanshu Kumar Semwal, PIED: A Proposal for Collaborative IDE for Poets using a Mobile or Wearable Device, The 2015 International Conference on Collaboration Technologies and Systems (CTS 2015) in technical collaboration with the ACM, IEEE, and IFIP, posters paper, pp. 450-453, 2015, *best posters paper award*. (38.30% acceptance rate) .

25 Michael Bernard Rudolph and Sudhanshu Kumar Semwal, A Method for 3D Content Creation, The 2015 International Conference on Collaboration Technologies and Systems (CTS 2015) in technical collaboration with the ACM, IEEE, and IFIP, technical poster, research poster abstract paper, pp. 474-476, 2015 (38.30% acceptance rate).

26 Pam Wood and Sudhanshu Kumar Semwal, On Exploring Connection Between Music Classification and Evoking Emotion, The 2015 International Conference on Collaboration Technologies and Systems (CTS 2015) in technical collaboration with the ACM, IEEE, and IFIP, technical poster abstract paper, pp. 481-481, 2015.

27 Ryan Thomas and Sudhanshu Kumar Semwal, Ray Tracing using 3D Grid Simulations, Proceedings of the World Congress on Engineering and Computer Science vol 1 WCECS 2014, 22-24 October 2014, San Francisco, USA, 2014 IAENG International Conference on Internet and Multi Media Technology (ICIMT'14) San Francisco, USA, October 22-24, 2014. ISBN 978-988-19252, 0-6, pp. 376-381. (51.28% acceptance).

28 Joshua Hendricks and Sudhanshu Kumar Semwal, EEG: The missing Gap between Controllers and Gestures, Proceedings of the World Congress on Engineering and Computer Science vol 1 WCECS 2014, 22-24 October 2014, San Francisco, USA at the 2014 IAENG International Conference on Internet and Multi Media Technology (ICIMT'14), ISBN 978-988-19252, 0-6, pp. 403-408. 2014. (51.28% acceptance).

29 Abdullah Almuryh, and Sudhanshu Kumar Semwal, Computing Interfaces for Everyone, Proceedings of the World Congress on Engineering and Computer Science vol 1 WCECS 2014, 22-24 October 2014, San Francisco, USA at the 2014 IAENG International Conference on Internet and Multi Media Technology (ICIMT'14). ISBN 978-988-19252, 0-6, pp. 387-392. 2014. (51.28% acceptance)(**WCECS'14 Certificate of Merit of ICIMT 2014**).

30 Abdullah Almuryh, Sudhanshu Kumar Semwal, and Albert Glock, Multichannel User Interfaces towards Crossover Inclusive Computing, Proceedings of the World Congress on Engineering and Computer Science vol 1 WCECS 2014, 22-24 October 2014, San Francisco, USA at the 2014 IAENG International Conference on Internet and Multi

Media Technology (ICIMT'14) ISBN 978-988-19252, 0-6, pp. 423-427, 2014. (51.28% acceptance)(**WCECS'14 Best Paper Award of ICIMT'14**).

31 Abdullah Almuryh and Sudhanshu Kumar Semwal, Xen Web-based Terminal for Learning Virtualization and Cloud Computing Management, Proceedings of the World Congress on Engineering and Computer Science vol 1 WCECS 2014, 22-24 October 2014, San Francisco, USA at the 2014 IAENG International Conference on Education and Information Technology (ICEIT'14) ISBN 978-988-19252, 0-6, pp. 329-333 2014. (51.28% acceptance)(**WCECS'14 Best Student Paper Award of ICEIT'14**).

32 Omamah Hawsawi and Sudhanshu K. Semwal, EEG Headset Supporting Mobility Gamers with Games Accessibility, accepted for publication in 2014 IEEE International Conference on Systems, Man, and Cybernetics, pp.851-855, October 5-8, 2014, San Diego, CA.

33 Tim Poley and Sudhanshu K. Semwal, Mobile Graphics with Peer-to-Peer Android based Collaborative Systems, accepted for publication in 2014 IEEE International Conference on Systems, Man, and Cybernetics, pp. 845-850, October 5-8, 2014, San Diego, CA.

34 Keith Johnson and Sudhanshu K Semwal, Shapes: A Multi-Sensory Environment for the B/VI and Hearing Impaired Community, 2nd International Workshop on Virtual and Augmented Assistive Technology (VAAT) at **IEEE Virtual Reality 2014**, 29 March - 2 April, Minneapolis, MN, USA, pp.1-6 (2014).

35 Adrian Johnson and SK Semwal, Comparative Visual Aesthetics in Synesthetic Structures, 21st International Conference on Computer Graphics, Visualization and Computer Vision, **WSCG 2013**, June 24-27, 2013. Poster papers proceedings, pp. 17-21, ISBN 978-80-86943-76-3, 2013, in cooperation with Eurographics Association.

36 Richard Doyle and SK Semwal, Computational Celtic Canvas for Zoomorphs and Knotworks, 21st International Conference on Computer Graphics, Visualization and Computer Vision, **WSCG 2013**, June 24-27, 2013. Full papers proceedings: ISBN 978-80-86943-74-9, pp, 143-150 in cooperation with Eurographics Association (**26% percent** acceptance rate).

37 (Invited for **journal** publication) Mounika Namburu and Sudhanshu Kumar Semwal, Voice Morphing for the B/VI Community, MHCI 2013 International Conference on Multimedia and Human Computer Interaction conference, Ryerson University, Toronto, Canada.

38 (Invited for **journal** publication) Andrea Brunner and Sudhanshu Kumar Semwal, Musical Canvas: A Drawing Tool for the Visually Impaired, MHCI 2013 International Conference on Multimedia and Human Computer Interaction conference, Ryerson University, Toronto, Canada.

39 (Invited for **journal** publication) Li Ping and Sudhanshu Kumar Semwal, Interactive Math Game for Elementary Aged School Children, MHCI 2013 International Conference on Multimedia and Human Computer Interaction conference, Ryerson University, Toronto, Canada.

40 Abdullah Almurayh and Sudhanshu Semwal, Cultural Considerations for Designing Crossover Applications for the Visually Impaired, **IEEE IRI 2013** – The 14th

International Conference for Information Reuse and Integration, DIM Program San Francisco, USA, August 14-16, (2013)(**Acceptance rate 26%**).

41 Abdullah Almurayh and Sudhanshu Semwal, Controlling Xen Cloud Platform via smartphones, **IEEE IRI 2013** – The 14th International Conference for Information Reuse and Integration, DIM Program, San Francisco, USA, August 14-16, (2013)(**Acceptance 26%**).

42 William Fitzpatrick, Mark Wickert, and Sudhanshu Semwal, 3D Sound Imaging with Head Tracking, **IEEE** DSP/SPE Digital Signal Processing and Signal Processing Education Workshop, August 11-14, 2013, Acoustic Analysis and Processing Session, pp. 1-7, (2013).

43 Kelly Gershefske and Sudhanshu Semwal, Using Physical Activity transition to reduce the perceived burden of interruption by Mobile Phones, published at the 14th IASTED International Conference on Computer Graphics and Imaging (CGIM) at Innsbruck, Austria, pp. 1-8 (Feb 2013). (***Accepted for journal publication**).

44 Jonathan Metzgar and Sudhanshu Kumar Semwal, Approximating the fire flicker using the local dynamic radiance maps, **WSCG 2012 Conference**, 20th International Conference Graphics, Visualization and Computer Vision, Plzen, pp. 1-8 (2012) pdf

45 George Mudrak and Sudhanshu Kumar Semwal, "Agent City: An agent based modeling approach to city planning and population dynamics, pp. 91-96 at The 2-12 International Conference on Collaboration Technologies and Systems (**CTS2012**), in cooperation with ACM, IEEE, and IFIP, May 21-25th, 2012, Denver, Colorado (2012).

46 Mike Bolei and Sudhanshu Kumar Semwal, "Evolving patterns of human interactions, pp. 616-621, at The 2012 International Conference on Collaboration Technologies and Systems (**CTS2012**), in cooperation with ACM, IEEE, and IFIP, May 21-25th, 2012, Denver, Colorado (2012).

47 Sudhanshu Kumar Semwal, George Mudrak and Mike Bolei: CTS 2012 T.7 Tutorials, part of six presentations as Key Note Speeches: 2.5 hrs presentation on Introduction to Complexity in Collaborative Environments, pp. 3-17 (2012). Digital Object Identifier: PowerPoint Slides 1-67 available on request.

48 Jonathan Kip Knight and Sudhanhsu Semwal, "Unbiased Closed Form Solutions for Center of Rotation," *Springer-Verlag, Communication in Computer Science, 68*, pp.73-88, (2009) Revised Selected Papers from **GRAPP Conference** 2009; **Book**, ISBN 978-3-642-11839-5 A.K. Ranchordas et.al. Editors (**Selected papers from GRAPP 2009).**

49 Wilke, Jonathan Metzgar, Keith Johnson, SK Semwal, Bonnie Snyder, KaChun Yu, Dan Neafus. Crossover Applications. IEEE VR 2009 Conference, pp. 305-306 March 14-18 (2009).

50 James Holland and SK Semwal, Flocking Boids with Geometric Vision, Perception and Recognition, International Conference on Computer Graphics, Visualization, and Computer Vision, WSCG 2009 Plzen, CZ, pp.211-218 (2009) ISBN 978-80-86943-93-0 (**41 out of 184, 22% acceptance**).

51 JF Torrez, K Knight, Y Wang, J Carrollo, E Chow, S Semwal, Improved Rehab patient care with Laban Specification and wireless sensor tracking, GCMAS 2009, 12th Annual Gate and Movement (HCMAS 2009) meeting, pp.1-2 (2009).

52 Jonathan Kip Knight and SK Semwal, New Closed form Solutions for Skeletal Extraction from Motion Capture, GRAPP 2009, International Conference on Graphics Theory and Applications, Losboa, Portgal, February 5-8, 2009, pp. 1-8. **Extended version selected appeared in a book form**.

53 Charles Thomas Wolfe and SK Semwal, Acoustic Modeling of reverberation using Smooth Particle Hydrodynamics, accepted at 16th International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision, Plzen ISBN 978-80-86943-15-2, pp. 191-198 (Feb 2008) (**47 out of 186 accepted; 24.0%**).

54 Suzette Stoutenburg and SK Semwal, Modeling context using brain-signal interpretation. The second annual conference for Interactive Technologies for Entertainment (INTETAIN 2008) pp. 1-4, Jan 8-10, Mexico (2008) in cooperation with SIGCHI (late breaking paper).

55 Jonathan Kip Knight and SK Semwal, Fast Skeleton estimation from motion captured using Generalized Delogne-Kasa method, 15th International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision, Plzen Full paper proceedings, **WSCG 2007 Conference** (ISBN 978-80-86943-98-5) pp. 225-232 (Feb 2007)(**61 out of 252; 25.1%**).

56 SK Semwal and Phil Gage, 3D View-Coherence, 15th International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision, Poster paper proceedings, **WSCG 2007 Conference** (ISBN 978-80-86943-99-2) Plzen pp. 17-21(Feb 2007).

57 Jeremy Bryan and SK Semwal, Fast simulation of Lighting for 3D Games, Proceedings of the second IASTED International conference on Environment Modeling and Simulation November 29-Dec 1, 2006 (EMS 2006) St Thomas, USVI, pp. 72-76 ISBN 0-88986-617-1 (November 2006).

58 Eric M Upchurch and SK Semwal, Simulating Trees using Fractals and L-Systems, Proceedings of the second IASTED International conference on Environment Modeling and Simulation November 29-Dec 1, 2006 (EMS 2006) St Thomas, USVI, pp 118-123 ISBN 0-88986-617-1 (November 2006).

59 SK Semwal, Bill Watson, Debral L McCullough, Human Muscle Modeling using Generalized Cyliders for volume considerations, pp 1-7, The 4th IASTED International conference on Biomedical Engineering (BioMed 2006), February 15-17, Innsbruk, Astria, (2006), pp. 118-123.

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96 Lisa Nafziger and Sudhanshu Kumar Semwal, Modeling Diffraction Grating Surfaces Using Ray Tracing Proceedings of The 5th International Conference on Engineering Computer Graphics and Descriptive Geometry, Melbourne, Australia, pp. 17-21, August (1992).

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101 Ron Broome and Sudhanshu Kumar Semwal, The UCCS Visual Programming Interpreter, CASE 89: The International Workshop on Computer-Aided Software Engineering, Imperial College, London. British Computer Society and the IEEE Computer Society (1989).

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Manuscripts under preparation/review

(1) Sudhanshu Semwal, Mike Bolei and Bonnie Snyder, Recycled Braille Displays and Emergence of Enrichment Center for the B/VI Community, pp. 1-4.
(2) George Mudrak, Mike Kopps and SK Semwal, Predation Model of Bullying: An agent Based Model of Bullying using Predator-Prey Behavior, pp. 1-4.
(3) Dome Displays and Vpresent with Nick Steling, Jonathan Metzgar etal.
(4) Interactive haptic mesh sculpting with Rudolpho Ortiz
(5) Memory Games for the Blind with Barbara Tracey
(6) Modeling Ink flow with Ben Wood
(7) OpenVGF: An Open Source Video Game Framework with Daron Anderson
(8) Target Tracking a non-linear path using Kalman predictive Algorithm with Dennis Musick etal
(9) "haptic objects editing" with Michael Rudolph
(10) Haptic medical visualization with John Magby, Mike Bolei, Karl Reinig.
(11) Voice Recognition with Tony Beld.

ABSTRACTS, AND BOOK CONTRIBUTIONS

1. Sudhanshu Kumar Semwal, The Slicing Extent Technique for Fast Ray Tracing, Dissertation Abstract published in Computer Graphics, Vol. 2, No. 2, pp. 88-89, April (1988).
2. Sudhanshu K. Semwal, with Scot Tharne Refsland et al, Virtual Great Barrier Reef: A Theoretical Approach Towards and Evolving Interactive VR Environment using a Distributed DOME and CAVE System, A book on Virtual Worlds based upon distinguished papers awarded in VW98 conference, edited by Jean-Claude Heudin, and Yaneer Bar Yam entitled Virtual Worlds Synthetic Universe, Digital Life, and Complexity published by Perseus Books, contains the Scan\&Track virtual environment being developed at my University, pp. 161-164, ISBN 0-7382-0050-6 (1999).
3. Sudhanshu K. Semwal, L. Ted Ryder, Keith Seyler, Color and Texture Correlate data, pp. 1-6 in Visual Cues by Peter R. Keller and Mary M. Keller, IEEE Computer Society Press. (1993).

TEACHING

When I joined UCCS there were two graphics courses: Introduction to Graphics and Advanced Computer Graphics. Both these courses have been completely revamped. In addition, I have

introduced seven new courses over the years to support the MS and PhD students interested in this area and the GMI™ Program: 3D Games and Digital Content Creation; Wearable Computing and Complex Systems Theory; Computer Graphics Animation and Visualization; Geometric Modeling; Computational geometry; Virtual Reality and Human Computer Interaction; and Designing Efficient Algorithms on Parallel Systems.

I have taught on the average four to five courses per academic year.
CS4800/5800 -- Introduction to Computer Graphics (Fall 87, 88, 89, 92, 94, 96, 97, 98, 99, 2000, 2001, 2003, 2004, 2005, 2008-2016, and Spring 98, 2006, 2007, 2008).
CS5810 -- Advanced Computer Graphics (Spring 88, 89, 90, 91, 95, 97, 99, 2002, 2004, Spring 2010, Spring 2013).
CS5750 -- Computational Geometry (Fall 88, Spring 93, Summer 94, Fall 2000, Summer 2002, Winterim 2006/07, Summer 2008, Summer 2010, Summer 2011, Summer 2013).
CS5770 -- Computer Graphics Animation and Visualization (Fall 92, 93, 94, 96, 98, 2001, Spring 2000, Fall 2003, Spring 2005, Fall 2007, Fall 2009, Fall 2011, Fall 2013).
CS576 -- Geometric Modeling (Fall 90).
CS5780/4780 -- 3D Games and Digital Content Creation (Spring 2004, Fall 2005, Spring 2006, Fall 2007, Spring 2010, Spring 2011, Spring 2012, Spring 2014, Fall 2016).
CS5790 -- Wearable Computing and Complex Systems (Spring 2003, 2005, Fall 2006, Spring 2008, Spring 2011, Spring 2013, Spring 2015, Spring 2017).
CS6770 --Virtual Reality and Human Computer Interaction (Spring 93, 94, 95, 96, 98, 2001 Fall 99; Spring 2005, 2007, Fall 2008, Fall 2010, Spring 2012).
CS4720/5720 -- Design and Analysis of Algorithms (Spring 88, 89, 90, 91, 96, 97, 98, 99, 2017, Fall 90, 2006, Summer 2012, Fall 2012, Summer 2013, Spring 2014, Fall 2014, Fall 2015).
CS6720 -- Designing Efficient Algorithms on Parallel System (Summer 88, 89).
CS 2060 – Introduction to C Programming (Summer 2012, Summer 2014, Spring 2015, Summer 2015, Summer 2016).
CS4700/5700 -- Theory of Automaton (Fall 87).
CS1450 -- Data Structures with Java (Spring 2000).
CS1150 -- Introduction to Java (Fall 2000). and
CS1450 -- Data Structures and Algorithms II (Fall 93).
Honors Program: GPS 1010 Course (Gray Matters) Fall 2014, 2015, 2016.

Instructor overall ratings: CS 4800/5800 (5.1/6.0), CS 5780 (5.3), GPS 1010 Gray Matters (5.7/6.0).
Following Table 1-5 provides summary of FCQs (Fall 2009 – Summer 2014).

Semester	Course	7. Course overall	8. Instructor overall	9. Instr.respect professional treatment
F 2009	CS4800/5800	5.0	5.1	5.8
F2009	CS5770	5.1	5.1	5.6
S 2010	CS5810	5.2	5.3	5.6
S 2010	CS4780	4.7	4.8	5.7
Su2010	CS5750	5.3	5.3	6.0 (*)

Table 1: 2009-2010 FCQs.

Semester	Course	7. Course overall	8. Instructor overall	9. Instr.respect professional treatment
F 2010	CS6700	5.9	5.9	6.0 (*)
F2010	CS4800/5800	4.4	4.9	5.9
S 2011	CS5790	5.4	5.8	6.0 (*)
S 2011	CS5750	5.5	5.5	6.9 (*)

Table 2: 2010-2011 FCQs

Semester	Course	7. Course overall	8. Instructor overall	9. Instr.respect professional treatment
F 2011	CS4800/5800	4.5	4.9	5.9
F2011	CS5770	5.8	5.8	6.0 (*)
S 2012	CS6770	5.8	5.8	5.8
S 2012	CS4780	5.0	5.1	6.0 (*)
Su2012	CS2060	5.0	5.3	6.0 (*)
Su 2012	CS4720/5720	4.8	5.0	6.0 (*)

Table 3: 2011-2012 FCQs

Semester	Course	7. Course overall	8. Instructor overall	9. Instr.respect professional treatment
F 2012	CS4800/5800	4.4	4.8	5.9
F2012	CS4720/5720	4.6	5.1	5.9
S 2013	CS5790	5.4	5.4	5.9
S 2013	CS5810	5.6	5.7	5.9
Su2013	CS5750	5.3	5.7	6.0 (*)
Su 2012	CS4720/5720	4.6	5.4	5.9

Table 4: 2012-2013 FCQs

Semester	Course	7. Course overall	8. Instructor overall	9. Instr.respect professional treatment
F 2013	CS4800/5800	5.5	5.7	5.9
F2013	CS5770	5.4	5.9	6.0 (*)
S 2014	CS4780/5780	5.6	5.8	6.0 (*)
S 2014	CS4720/5720	4.9	5.5	5.8
Su2014	CS2060	N/A	N/A	N/A

Table 5: 2013-2014 FCQs

I was on sabbatical in Fall 2002, Spring 2009, and Spring 2016. I also served as the Chair of the CS Department in Spring 2002.

GRADUATE STUDENTS ADVISING

I am currently the major advisor for 14 M.S. students and 4 Ph.D. students. Following are current Ph.D. students: Abdullah Almuryh (2013); Ryan Thomas (2013); Jonathan Metzgar (2013); Pam Wood (Summer 2014).

I have supervised the following Ph.D students as their major thesis-advisor – Richard Doyle (PhD, CS 2008); Jonathan Kip Knight (PhD CS 2008); David Bolt (1999). Daron Anderson was the first Masters of Engineering Media Convergence, Games and Media Integration (McGMI) student in 2007.

Following is the list of students who have graduated under my supervision as Thesis Advisor since 1987: James Logan (1988); Ya-shu Feng; Jordon Strub; Barry Gamblin; Darin Buchannan; Steven Sharp; David Dauenhauer; Charulata Kearny; Susan Propst; Paul Swann; Douglas Dow; Debra Evans-Kemp; James Whitney; Mark Freiheit; Lisa Nafzieger; Jeffery Light; Michael Gonzalez; David Bolt; Jonathan K. Armstrong; Bill Flentji; George Gestalum; Neil Pachter; Vincent Waites; Bernadatte Julia Lee; David Watson; Debra McCullough; Hakan Kvanstrom; Robert S Zucker; Joakim Johnson; Catherine Tran; Per Sodren; David Pittinga; Gary Withrow; Richard Doyle; Phillip Cage; Sean Elbert; Chung Nguyen; Richard Hedling; Jaideep Chadha; David Norman; Chris Koenhart; Takuro Shishido; Chris Cagle; Andrew Abraham; Jonathan J Halleuer; Steve Boone; Rudolpho Ortiz (2007); Kelly Wihtcare (2008); Eric Upchurch (2008); Grant Cahil (2009); Thomas Wolfe (2007); Daron Anderson (2007, GMI); Barbara Treacy (2009), Jeremy Brian (2007), Adrian Johnson (2007); Mike Kirshman (2005); Jim Holland (2008); Dustin Carrol (2006); Chris Koenert (2005); Richard Claycomb (2005); Ed Mucker (2005); Chandrashekhar Kaushal (2005); Andrea Brunner (2012); Keith Johnson (2009); Michael Rudolph (2008); Brian Wilke (2013); Kaushik Banerjee (2010); William Fitzpatrick (2013); Nick Sterling (2014); Mike Bolei (2014); Christopher Malec (2014); Joshua Hendricks (2013); Mounika Numbaru (2012); George Mudraks (2013); Li Ping (2013); Ismail Bahkali (Summer 2014); Omamah Hawsawi (Summer 2014); Abdullah Almuryh (Summer 2014; Ph.D.); Chris Malec (Spring 2015); Irving Rynning (Fall 2015); Khalid Alharbi (Spring 2016); Rama Prasad Reddy (Spring 2017); Chaitanya Kumar Chava (Summer 2016); Aravindan Perumal (Spring 2017); Stephan Ashworth (2017); Manu Garg (2017); Dee Dee Rich (expected 2017).

In addition, I have also served as a Member of the M.S. committee for more than 60 graduate students.

PROFESSIONAL ACTIVITIES

CTS 2015, Atlanta, Chair of Demo Session I. I am also interested in pursuing interdisciplinary research with colleagues in Visual and Performing Arts, and TheatreWorks™. NSF HCI Panel Spring 2003. Attended 2014 IAENG Conference, San Francisco, WSCG 2007, 2009, 2013 at Plzen; MMVR 2004 (Newport Beach,CA); ISWC 2002 (University of Washington), ISWC 2003 (Yoroktown Heights, NY). NISSC PI-Workshop, Research lecture presentation, Haptic-Signatures for Cyberworld, Nov 2003.Security Poster Session, Feb 2003. Poster Sessions sponsored by the Office of Sponsored Research (Dr. David Schmidt), Fall 2003. Session Chair,WSCG 2008; IASTED EMS, Nov. 2004. Reviewer: WSCG 2005 (Winter School of Computer Graphics Conference). Presented a paper in the non-verbal information processing Meeting held at the ICME conference August 23-August 25, Tokyo (2001). International Program Committee Member, 2nd International Virtual Worlds 2000 Conference, Paris, May 2000. Presented a paper in the non-verbal information processing meeting held along with the ICME conference July 31-Aug 2, NY (2000). Presented a paper in the Very Low Bit Video Rate (VLBV) conference, in Kyoto, Japan (October 1999). International Program Committee

Member, International Conference on Artificial Reality and Tele-Existence (ICAT99, ICAT2000, ICAT2001, ICAT2002, ICAT2003, ICAT 2004-08).

Distinguished invited lecture on Complexity Issues in Virtual Environments, at the International Conference on Artificial Reality and Tele-Existence (ICAT98), Tokyo December 21-23, 1998.

Attended 2nd Consortium Meeting of Non-Verbal Information Processing Group, to be held at Seika-Cho, Kyoto (October 1999). The 1st Consortium Meeting of this group was held in Colorado Springs in January 30-31, 1999.

Program Committee member: 4th International Conference on Virtual Systems and Multi-Media (VSMM98), Gifu, Japan, November 1998. Visit to SantaFe Institute for one week in March 1999, and on April 6, 2015. Presented my research, and interacted with researchers with possibilities of applying Evolutionary Computation techniques for VR applications.

Reviewer: Presence (1998); VSMM 1998 Conference at Gifu, Japan; Reviewer for IEEE CG&A's special issue based on the selected papers in IEEE VRAIS 97 conference; VRST 1997 conference; VSMM 1997, 1998 conference; IEEE VRAIS 1996; PRESENCE Journal (MIT Presence); International Journal of Virtual Reality (IJVR) IPI Press; Referee for Information and Software Technology, Butterworth-Heinemann Ltd., Linacre House, Jordon Hill, Oxford, UK 1990.

Association of Computing Machinery (SIGGRAPH) member, IEEE Computer Society, UCCS Toastmaster's Club. Juror: ACM Programming Contest, UCCS, 1988. Attended: ICCAD Conference, at San Jose, California, 1987; SIGGRAPH 1988 (Atlanta), 1989 (Boston), 1995 (Los Angles); Symposium at Fort Collins, Colorado, 1988 and 1989; IEEE Virtual Reality Annual International Symposium (VRAIS) Conference, Santa Clara, CA, 1996;
Virtual Reality and Persons with Disability Conference, Los Angels, CA, June 1993.

Presented: Series of lectures at ATR, Kyoto, Japan on Ray Tracing, Virtual Humans and Avatars, Visualization of Medical Images, and the Scan&Track Virtual Environments (Summer 1997, Summer 1998, Summer 1999). Presented The Scan&Track Virtual Environments at the Virtual Worlds 1998 conference in Paris (Summer 1998). Presented paper at SIAM Conference on Geometric Design, Phoenix, Arizona, 1989; International Phoenix Conference on Computers and Communications, Phoenix, Arizona, 1989; Graphics Interface Conference at Kelowna, BC (1997); Graphics Interface Conference at Halifax, Canada (1990); Computer Graphics International Conference at Singapore (1990); IEICE Conference, Tokyo, Japan (1992); Information Processing Society Conference, Tokyo, Japan, (1992); The New Trends in Neural Networks Conference, Brugge, Belgium, (1992); Summit Series Lecture Working and Living in Japan -- My Experiences, UCCS, February 1993; IEEE communications Conference, Ocho Rios, Jamaica 1995. Presented Virtual Reality lecture sponsored by the student Chapters of ACM, IEEE, Math Club. March 1993. Presented Human Animation in Virtual Environment, sponsored by the local Chapter of ACM, Colorado Springs, May 1993. Presented Virtual Reality and its Applications, at the TRW sponsored Object Oriented Design Conference

Presentation, Colorado Springs, May 1993. Presented Virtual Reality: An ultimate form of human computer interaction lecture, University of Colorado Programming Board, February 1994. Presented Virtual Reality lecture, Curiosity Unlimited, May 1994. Session Chair: ICIAM Conference, Washington DC (1991). Crimson Tide Movie accepted at a conference (SCCG 2006) in Europe, student Jonathan Pearson (Faculty Advisor: Semwal): Our 1st official UCCS Movie. Local Chapter of SigGraph awarded second prize to Thomas Wolfe (Faculty Advisor: Semwal) graphics water simulation work (2005). Alice Programming (2008); Aroma Applications (2009); Crossover applications (2008-2014); Sustainability and Green Technology focus (since 2008); Technical program committee member (EUC 2008) Shanghai. Faculty advisor: Games Club (2007-2016).