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EDUCATION

1984	Ph.D., Electrical and Computer Engineering, Carnegie Mellon University Thesis Title: *Dynamic Visual Servo Control of Robots: An Adaptive Image-Based Approach*
1976	M. S., Biomedical Engineering, Carnegie-Mellon University
1972	B.S., Electrical Engineering, University of Pittsburgh

PROFESSIONAL EXPERIENCE

At Carnegie Mellon University:

2003 - Present	Research Professor, The Robotics Institute
2003 - Present	Courtesy Appointment, Materials Science and Engineering Department
2002 - Present	Courtesy Appointment, Biomedical Engineering Department
1994 - Present	Courtesy Appointment, The Institute for Complex Engineered Systems
1997 - 2003	Principal Research Scientist, The Robotics Institute
1990 - 1997	Senior Research Scientist, The Robotics Institute
1985 - 1990	Research Scientist, The Robotics Institute
1983 - 1985	Research Associate, The Robotics Institute
1979 - 1983	Research Assistant, The Robotics Institute
1974 - 1976	Research Assistant, Biomedical Engineering Program

Other

2006 – Present	Member Faculty, McGowan Institute for Regenerative Medicine, The University of Pittsburgh
1976 - 1979	Biomedical Engineer, ARCO Medical Products Company, Vandergrift, PA.
1973 - 1974	Electrical Engineer, Fischback and Moore, Greentree, PA.

PUBLICATIONS

Chapters in Books:

1. **Weiss, L.E.** Processes overview. In "JTEC/WTEC panel report on rapid prototyping in Europe and Japan," Prinz, F.B., ed. 1997 Vol. I. Analytical chapters. Baltimore, MD: Loyla College. .
2. Beaman, J. and **Weiss, L.E.**, Process Methods, in "Solid Freeform Fabrication: A New Direction in Manufacturing," ed., J. Beaman, et. al., Kluwer, 1997
3. **Weiss, L. E.**, Computer-Aided Process Planning in Robotic-Based CIM Systems, in "Expert Systems and Robotics," Timothy Jordanides and Bruce Torby, Springer-Verlag, 1991.

4. Cerrada C., Katsushi, I., **Weiss, L.** and Reddy, R., A 3D-Object Reconstruction System Integrating Range-Image Processing and Rapid Prototyping, in "Engineering Systems with Intelligence: Concepts, Tools and Applications," Spyros G. Tzafestas ed., Kluwer Academic Pub., 1991.
5. Sanderson, A. C., **Weiss, L. E.**, and Neuman, C. P., Adaptive Control of Sensor-Based Robotics Systems, in "Intelligent Robots: Achievements and Issues," David Nitzan and Robert C. Bolles ed., 1985.
6. Sanderson, A. C., and **Weiss, L. E.**, Adaptive Visual Servo Control of Robots, in "Robot Vision," Alan Pugh ed., 1982.

Journal Papers:

1. Alfaro, F., **Weiss, L.**, Campbell, P., Miller, M., and Fedder, G., "Design of a multi-axis implantable MEMS sensor for intraosseous bone stress monitoring," *Journal of Micromechanics and Microengineering* (submitted Feb 2009)
2. Miller ED, Phillippi JA, Fisher GW, Campbell PG, Walker LM, **Weiss LE**. "Inkjet printing of growth factor concentration gradients and combinatorial arrays immobilized on biologically-relevant substrates," *Combinatorial Chemistry and High-throughput Screening* (In Press).
3. Li, K., Chen, M., Kanade, T., Miller, E.D., **Weiss, L.E.**, Campbell, P.G., "Cell Population Tracking and Lineage Construction with Spatiotemporal Context," *Medical Image Analysis Journal*, Vol. 12, No. 5 (2008) pp. 546-566
4. Phillippi, J., Miller, E., **Weiss, L**., Huard, J., Waggoner, A., Campbell, P. "Engineered Microenvironments Direct Stem Cell Fate." *Stem Cells*, 26(1), pp.127-134, 2008
5. Filiz, S., Xie, L., **Weiss, L.E.**, and Ozdoganlar, O.B., Micromilling of Microbarbs for Medical Implants, *International Journal of Machine Tools and Manufacture*, 48(2008) 459-472
6. Campbell, P. and **Weiss L.**, "Tissue engineering with the aid of inkjet printers," *Expert Opinion on Biological Therapy*, 7(8), 2007, pp. 1123-1127.
7. Li, B., Santhanam, S., Schultz, L., Jeffries-EL, M., Iovu, M.C., Sauvé, G., Cooper, J., Zhang, R., Revelli, J., Kusne, A., Snyder, J., Kowalewski, T., **Weiss, L**., McCullough, R.D., Fedder, G., and Lambeth, D., "Inkjet Printed Chemical Sensor Array Based on Polythiophene Conductive Polymers," Sensors & Actuators B, Vol. 123, No. 2, p 651-60, 2007.
8. Li,B., Sauve´, G., Iovu, M., Jeffries-EL, M., Zhang, R., Cooper, J., Santhanam, S., Schultz, L., Revelli,| J., Kusne, G., Kowalewski, T., Snyder, J., **Weiss, L.**, Fedder, G., McCullough, R., and Lambeth, D., "Volatile Organic Compound Detection Using Nanostructured Copolymers," Nano Letters, 6(8), 2006, pp. 1598-1602
9. Xie, L., Brownridge, S., Ozdoganlar, O. B., and **Weiss, L**., 2006, "The viability of micromilling for manufacturing mechanical attachment components for medical applications," Transactions of the NAMRI/SME, XXXIV, pp. 445–452
10. **Weiss, L.**, Amon, C., Finger, S., Miller, E., Romero, D.Verdinnli, I., Walker, L., Campbell, P., "Bayesian computer-aided experimental design of heterogeneous scaffolds for tissue engineering," Computer-Aided Design, 37: 1127-3, 2005 (Invited Paper)
11. R. D. McCullough, G. Sauvé, B. Li, M. Jeffries-El, S. Santhanam, L. Schultz, R. Zhang, M. C. Iovu, J. Cooper, P. Sreedharan, J. C. Revelli, A. G. Kusne, T. Kowalewski, J. L. Snyder, **L. E. Weiss**, D. N. Lambeth and G. K. Fedder, "Regioregular Polythiophene Nanowires and Sensors," in *Proc. of SPIE - The International Society for Optical Engineering*, Vol. 5940, Organic Field-Effect Transistors IV, 2005, pp. 28-34 (*Invited Paper*)

12. Campbell, P, Miller, E., Walker, L, Fisher, G., and **Weiss, L**., "Engineered Spatial Patterns of FGF-2 Immobilized on Fibrin Direct Cell Organization," *Biomaterials* , 26(33), 6762-6770, 2005
13. Miller, E.D., Fisher, G.W., **Weiss, L.E.**, Walker, L., and Campbell, P.G., "Dose-Dependent Cell Growth in Response to Concentration Modulated Patterns of FGF-2 Printed on Fibrin," *Biomaterials*, 27(10), 2213-2221, 2006
14. Calvert, J.W., **Weiss, L.E.**, and Sundine, M.J., "New Frontiers in Bone Tissue Engineering, Clinics in Plastic Surgery," 30, pp. 641-648, 2003
15. Mooney, M., Calvert, J., Hollinger, J., Marra, K., **Weiss, L.,** Campbell, P., Kumta, P., and Bidic, S., "Rabbit Calvarial Wound Healing Using Seeded Caprotite Scaffolds", *Journal of Dental Research*, 82(2):131-135, 2003
16. Reischmann, M., Merz, R., Schultz, L., and **Weiss, L.**, "Prototype Implemtation of an Assembly System for Tissue Engineered Constructs," *Elektrotechnik und Informationstechnik*, July/August, 2002, pp. 248-252
17. **Weiss, L.**, "Tissue Engineering: Solid Freeform Fabrication of Scaffolds," *Science & Medicine*, e.d. A. E. Meier, Vol. 8, No.1, pp. 6-7, 2002
18. Dutta, D., Prinz, F., Rosen, D. and **Weiss, L**., "Layered Manufacturing: Current Status and Future Trends," *Trans. ASME JCISE*, Vol. 1, No. 1, pp. 60-71, 2001
19. Jay W. Calvert, Kacey G. Marra, Lisa Cook, Prashant N. Kumta, Paul A. DiMilla, **Lee E. Weiss**, "Characterization of osteoblast-like behavior of cultured bone marrow stromal cells on various polymer surfaces" *J. Biomed. Mat. Res*., Volume 52, Issue 2, 2000, pp. *279-284*
20. M. D. Feldman, B. Sun, B. J. Koci, C. C. Wu, J. R. Kneller, H. S. Borovetz, S. Watkings, A. Nadeem, **L. E. Weiss**, M. L. Reed, A. J. C. Smith, W. Rosenblum, Stent-Based Gene Therapy, Journal of Long-Term Effects of Medical Implants 10(1-2), 47-68, 2000.
21. M.P. Stout, K.J. Gabirel, **L.E. Weiss** and P. Campbell, Precision Geometry Scaffolding Using MEMS Technology, *Cells Tissues Organs*, 2000;166:79-82
22. Marra, K.G.; Szem, J.W.; Kumta, P.N.; DiMilla, P.A.; **Weiss, L.E.**; "*In Vitro* analysis of biodegradable polymer blend/hydroxyapatite composites for bone tissue engineering," *J. Biomed. Mat. Res*., 1999, 47, 324-335.
23. Cooper, A., Kang, S., Kietzman, J., Prinz, F., Lombardi, J., and **Weiss, L.**, "Automated Fabrication of Complex Molded Parts Using Mold SDM," *Materials and Design*, Vol. 20, No. 2/3, 83-89, June 1999.
24. Richard H. Crawford, Joseph J. Beaman, Christopher Cavello, Jerry D. Jackson, **Lee E. Weiss**, and Carlo H. Séquin "Solid Freeform Fabrication: A New Manufacturing Paradigm," IEEE Spectrum, Vol. 36, No. 2, (1999) pp. 34-43
25. J. R. Kneller, C. C. Wu, D. A. Vorp, M. L. Reed, **L. E. Weiss**, H. S. Borovetz, S. Watkins, M. D. Feldman, The Use of Microfabricated Probes to Penetrate the Internal Elastic Lamina and Intimal Hyperplasia, Journal of Cardiovascular Diagnosis & Procedures 16(2), 37-50, 1999.
26. M. D. Feldman, B. Sun, B. J. Koci, C. Wu, S. L. Castilla, A. Nadeem, **L. E. Weiss**, M. L. Reed, A. J. C. Smith, W. Rosenblum, Microfabricated Probes Can be Used to Administer Gene Therapy, American Journal of Cardiology 82(7A), 28S - 29S, 1998
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29. **Weiss, L.** and Prinz, F., "Novel Applications and Implementations of Shape Deposition Manufacturing," Naval Research Reviews, Office of Naval Research, Three/1998, Vol. L
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32. **L.E. Weiss**, R. Merz, F.B. Prinz, G. Neplotnik, P. Padmanabhan, L. Schultz, K. Ramaswami " Shape Deposition Manufacturing of Heterogeneous Structures," *SME Journal of Manufacturing Systems*, Vol. 16, No. 4, (1997) pp. 239-248
33. Finger, S., Stivoric, J., Amon, C., Gursoz, L., Prinz, F., Siewiorek, D., Smailagic, A. and **Weiss, L.**, "Reflections on a Concurrent Design Methodology: A Case Study in Wearable Computer Design," *Computer-Aided Design*, special issue on Concurrent Design, vol. 28, no. 5, 1996
34. Finger, S., Terk, M., Subrahmanian, E., Kasabach, C., Prinz, F., Siewiorek, D.P., Smailagic, A., Stivorek, J. and **Weiss, L.**, "Rapid Design and Manufacture of Wearable Computers," *Communications of the ACM*, Vol. 39, No. 2, Feb. 1996.
35. **Weiss, L.E.** and Prinz, F.B., "A Thermal Spray Approach To Rapid Prototyping: An Extended Abstract," *ASM Journal of Thermal Spray Technology*, Vol. 3, No. 3, 1994.
36. Fasching, M., Prinz, F., and **Weiss, L.**, "Smart Coatings," *ASM Journal of Thermal Spray Technology*, Vol. 4, No. 2., 1995.
37. Fussell, P.S., Kirchner, H., Prinz, F.B. and **Weiss, L.**, "Controlled Microstructure of Arc Sprayed Metal Shells," *ASM Journal of Thermal Spray Technology*, Vol. 3, No. 2, June 1994.
38. **Weiss, L.,** Thuel, D., Schultz, L. and Prinz, F.B., "Arc Sprayed Steel-Faced Tooling," *ASM Journal of Thermal Spray Technology*, Vol. 3, No. 3, Sept., 1994.
39. Fasching, M.M., **Weiss, L.E.** and Prinz, F.B. "Application of Thgermal Spraying in Rapid Protyping and Sensor Fabrication," *Elektrotechnik und Informationstecknik*, Zeitschrift des Osterreichischen Verbandes fur Elektrotechnik (Electrical and Information Engineering, Austrian Society For Electrical Engineering), Feb. 1994.
40. Kanade, T., Reed, M. and **Weiss, L.**, "Robotics: New Technologies and Applications," *Communications of the ACM*, Vol. 37, No. 3, March 1994.
41. Kanade, T.; Reed, M.L.; **Weiss, L.E.**, "New technologies and applications in robotics," Journal A; J. A (Belgium); vol.35, no.4; Dec. 1994; pp. 3-10
42. Fasching, M.M., Prinz, F.B. and **Weiss, L.E.**, "Planning Robotic Trajectories for Thermal Spray Shape Deposition," *ASM Journal of Thermal Spray Technology*, Vol. 2, No. 1, 1993.
43. **Weiss, L.E.**, Prinz, F.B., Adams, D. and Siewiorek, D., "Thermal Spray Shape Deposition," *ASM Journal of Thermal Spray Technology*, Vol. 1, No. 3, 1992.
44. Kutay, A. and **Weiss, L. E.**, "Economic Analysis of Robotic Operations: A Case Study of a Thermal Spraying Robot," *Robotics and Computer Integrated Manufacturing*, Vol. 9, No. 4, 1992.
45. Reed, M.L., Han, H. and **Weiss, L.**, "Silicon Micro-Velcro," *Advanced Materials*, Vol. 4, Jan. 1992.

46. Han H., **Weiss, L.E.**, and Reed, M. L., "Micromechanical Velcro," *IEEE Journal of Microelectromechanical Systems,* Vol. 1, No. 1, March, 1992
47. Han H., Reed, M. L., and **Weiss, L.**, "A Mechanical Surface Adhesive Using Micromachined Silicon Structures," *Journal of Micromechanics and Microengineering*, No. 1, 1991.
48. Rapoport, S. D., Reed, M. L., and **Weiss, L. E.**, "Fabrication And Testing Of A Microdynamic Rotor For Blood Flow Measurements," *Journal of Micromechanics and Microengineering*, No. 1, 1991.
49. **Weiss, L. E.**, Gursoz, E.L., Prinz, F.B., Fussell, P.S., Mahalingam, S., and Patrick, E.P., "A Rapid Tool Manufacturing System Based On Stereolithography and Thermal Spraying," *ASME Manufacturing Review*, March, 1990.
50. Nayar, S. K., Sanderson, A. C., **Weiss, L. E.**, and Simon, D. A., "Structured Highlight Inspection Using Structured Highlight and Gaussian Images," *IEEE Journal of Robotics and Automation*, Vol. 6., No. 2, April, 1990, pp. 208-218
51. Nayar, S. K., **Weiss, L. E.**, Simon, D. A., and Sanderson, A. C., Structure highlight inspection of specular surfaces using extended Gaussian images. *Proceedings of the SPIE - The International Society for Optical Engineering*, v 1005, 1989, p 235-44
52. Sanderson, A. C., **Weiss, L. E.**, and Nayar, S. K., "Structured Highlight Inspection of Specular Surfaces," *IEEE Trans. Pattern Analysis and Machine Intellignece*, Vol. 10, No. 1., January 1988, pp. 44-55
53. **Weiss, L. E.,** Sanderson, A. C., and Neuman C. P., "Dynamic Visual Servo Control Of Robots," *IEEE Journal on Robotics and Automation*, Vol. RA-3, No. 5., October 1987, pp. 404-417

Columns:

Edited a bi-monthly column called 'WebWatch' for the journal *Tissue Engineering*. The column addressed how to use the Web to effectively find information relevant to tissue engineering (1999 to 2005).

Refereed Conference Papers:

1. G. K. Fedder, S. S. Bedair, N. Garg, J. Greenblatt, R. Jin, D. N. Lambeth, N. Lazarus, S. Santhanam, L. Schultz, J. L. Snyder, **L. E. Weiss**, and J. Wu, "Jetted Nanoparticle Chemical Sensor Circuits for Respirator End-of-Service-Life Detection," *12th International Meeting on Chemical Sensors*, July, 2008, Columbus, Ohio
2. K. Li, E. Miller, M. Chen, T. Kanade, **L. Weiss**, and P. Campbell, "Computer Vision Tracking Of Stemness," 2008 5th IEEE International Symposium on Biomedical Imaging: From Nano to Macro, May 2008, Paris, France
3. Li, B., Zhang, R., Sauvé, G., Cooper, J., Iovu, M.C., Santhanam, S., Schultz, L., Snyder, J.L., **Weiss, L.E.**, Kowalewski, T., Fedder, G., McCullough, R.D., and Lambeth, D.L., "Nanostructure Dependence of Conductive Polymer Chemical Sensors" *The 5th IEEE Conference on Sensors*, Gaegu, Korea, 2006
4. K. Li, E. Miller, **L. Weiss, P**. Campbell, T. Kanade, "Online Tracking of Migrating and Proliferating Cells in Phase-Contrast Microscopy," *Proceedings of the 2006 IEEE Conference on Computer Vision and Pattern Recognition Workshop (CVPRW '06)*, June, 2006, pp. 65 - 72.

5. J. F. Alfaro, **L. Weiss**, P. G. Campbell, M. C. Miller, C. Heyward, J. S. Doctor and G. Fedder, BioImplantable Bone Stress Sensor, in *Proceedings of the 2005 IEEE Engineering in Medicine and Biology 27th Annual Conference (EMBS '05)*, September 1-4, 2005, Shanghai, China.)
6. Li, B., Santhanam, S., Schultz, L., Zhang, R., Copper, J., **Weiss, L**., Kowalewski, T., Fedder, G.K., McCullough, R.D., Snyder, J.L., and Lambeth, D., Volatile Organic Compound Discrimination Using Nanostructured Polythiophene Sensors , *IEEE 4th International Conference on Sensors*, pp. 191-194, Irvine CA, 2005
7. Li, B., Santhanam, S., Schultz, L., Zhang, R., Copper, J., **Weiss, L.**, Kowalewski, T., Fedder, G.K., McCullough, R.D., Snyder, J.L., and Lambeth, D., Volatile Organic Compound Discrimination Using Nanostructured Polythiophene Sensors , *9th International Conference on Miniaturized Systems for Chemistry and Life Sciences*, Oct 2005
8. Günay, M., Shimada, K., Furuhata, T., **Weiss, L.**, Kanade, T., Krause, N., Mendicino, R., "Three-Dimensional Bone Shape Reconstruction from X-ray Images Using Hierarchical Free-Form Deformation and Non-Linear Optimization," *6th Annual International Conference on Medical Image Computing and Computer Assisted Intervention*, Toronto, Canada, Nov. 2003
9. Bidic, S., Calvert, J., Marra, K., Kumta, P., Campbell, P., Mitchell, R., Wigginton, W., Holinger, J., **Weiss, L.**, and Mooney, M., "Healing of Rabbit Calvarial Defects Using Caprotite Scaffolds Seeded with Autologous Bone Marrow Stromal Cells," *In Proc. Annual Meeting of the American Association of Dental Research,* Chicago, Ill., March 2001
10. Beuth, J., Ong, R., and **Weiss, L.** "Residual Stress Control for Thermal Deposition of Polymers in SFF Processes", *2000 Solid Freeform Fabrication Symposium*, The University of Texas At Austin, August, 2000
11. Mooney, M.P., Bidic, S.M.S., Calvert, J.W., Marra, K., Kumta, P.,Campbell, P., Mitchell, R., Wigginton, W., El-Gheriani, A.A., Hollinger, J.O., **Weiss, L**., *Healing of rabbit calvarial defects using Caprotite bone scaffolds*. Paper presented at the International Tissue Engineering Meeting, Innsbruck, Austria, May 18-20, 2000.
12. S. Kang, A. Cooper, J., Stampfl, F. Prinz, J. Lombardi and **L. Weiss**, "Improving Quality of Ceramic Parts with Mold SDM," *1999 Solid Freeform Fabrication Symposium*, The University of Texas At Austin, August, 1999
13. Cham, J.G., Pruitt, B.L., Cutcosky, M.R., Binnard, M., **Weiss, L.E.**, and Neplotnik, G., "Layered Manufacturing with Embedded Components: Process Planning Considerations," *Proceedings of DETC99: 1999 ASEM Design Engineering Technical Conference*, Sept, 1999, Las Vegas, NV
14. S. K. Gupta, Q. Tian, and **L. Weiss**, "Finding Near-Optimal Build Orientations for Shape Deposition Manufacturing," appeared in "Machining Impossible Shapes" IFIP TC5 WG5.3 *International Conference on Sculptured Surface Machining* (SSM 98) Nov., 1998, MI, USA
15. Gassner, R., Szem, J.W., Marra, K.G., Mooney, M.P., Kumta, P., **Weiss, L.E.** Autologie knochenmarkzellen verursachen fusion von hydroxylapatit-schichten unter bildung drei-dimensionaler vaskularisierter knochen-transplantate. Paper presented at the *Annual meeting of the Austrian Oral and Maxillofacial Society*, Innsbruck, Austria, June, 1999.
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18. Vorp DA, Okano T, Schiro BS, Sestile AJ, Campbell PG, **Weiss, LE,** "Effect Of Construct Constituents On The Burst Strength Of A Bone Marrow Stromal Cell-Based Tissue-Engineered Blood Vessel", *Tissue Engineering, Regenerative Healing and Stem Cell Biology Conference*, Pittsburgh, PA, October, 1999
19. T. Okano, J. Szem, P. Kumta, P. DiMilla, **L. Weiss**, T. Matsuda, "Preparation of multi-layer synthetic vessels for use in vascularized tissue engineered bone" *Tissue Engineering Society 2nd Annual Meeting*, December, 1998.
20. Szem, J.W.; Marra, K.G.; Mooney, M.P.; Kumta, P.N.; **Weiss, L.E.**; "Layered Manufacturing of Vascularized Bone Grafts Using Polymer/Ceramic Scaffolds and Autogenous Bone Marrow Cells," *Tissue Engineering Society 2nd Annual Meeting*, 12/98.
21. Cooper, A., Kang, S., Kietzman, J., Prinz, F., Lombardi, J., and **Weiss, L.E.,** "Automated Fabrication of Complex Molded Parts Using Mold SDM," *1998 Solid Freeform Fabrication Symposium*, The University of Texas At Austin, August, 1998, pp. 721-728
22. **Weiss, L.** and Prinz, F., "Novel Applications and Implementations of Shape Deposition Manufacturing," *3rd Pacific Rim International Conference on Advanced Materials and Processing*, Honolulu, Hawaii, July, 1998.
23. Feldman, M., Kneller, J., Wu, C., Watkins, S., **Weiss, L.**, and Reed, M., "Microfabricated Device for Intravascular Delivery," *47th Annual Scientific Session of The American College of Cardiology*, Atlanta, GA, March 1998
24. Fussell, P.S., Fessler J., Prinz, F.B., and **Weiss, L.E.**, 'Shape Deposition Manufacturing of Metals: Microstructures,' Interfaces, and Properties,' *1998 TMS Annual Meeting*, San Antonio, Texas, Feb. 1998
25. A. Nadeem, M. Mescher, K. Rebello, M. L. Reed, **L. Weiss**, M. Feldman, Fabrication of Microstructures Using Aluminum Anodization Techniques, Proceedings of the *Eleventh IEEE International Workshop on Micro Electro Mechanical Systems* (MEMS-98) Heidelberg, January 1998, pages 274 - 277.
26. Gupta, S.k., Tian, Q., and **Weiss, L.**, "Finding Near-Optimal Build Orientations for Shape Deposition Manufacturing," *International Conference on Sculptured Surface Machining, Maching Impossible Shapes* (IFIP TC5 WG5.3) Nov., 1998, MI.
27. Prinz, F.B., Merz, R. and **Weiss, L.**, "Building Parts You Could Not Build Before," Proceedings of the 8th International Conference on Production Engineering, Hokkaido University, Sapporo, Japan, Ed. Naoya Ikawa, Takeshi Kishinami and Fumihiko Kimura, Published by, Chapman & Hall (1997), 2-6 Boundary Row, London SE1 8HN, UK, in association with *Japan Society for Precision Engineering* (JSPE) JSPE Publication Series No. 2, August, 1997, pp. 40-4
28. Kietzman, J.W., Cooper, A.G., **Weiss, L.E.**, Schultz, L., Lombardi, J.L., and Prinz, F.B., 'Layered Manufacturing Material Issues for SDM of Polymers and Ceramics,' *1997 Solid Freeform Fabrication Symposium*, The University of Texas At Austin, August, 1997.
29. J. R. Kneller, C. C. Wu, S. Watkins, A. Nadeem, M. Reed, **L. Weiss**, M. D. Feldman, Microfabricated Device for Arterial Wall and Atherosclerotic Plaque Penetration, Paper 8.3.1, *IEEE Engineering in Medicine and Biology Conference*, Chicago, 1997, 2277-2280.

30. Schmaltz, K., Leoni, N., Padmanabhan, P., Amon, C., Finger, S., and **Weiss, L.**, "Investigation of Transport Phenomena in Microcasting Shape Deposition Manufacturing via Experiments Designed using Optimal Sampling," HTD-Vol. 347, *ASME National Heat Transfer Conference*, Volume 9, Baltomire, Marlyand, August, 1997, pp. 241-250
31. Bourell, D.L., Beaman, J.J., Barlow, J.W., Crawford, R.H., Marcus, H.L., and **Weiss, L.E.**, "Current and Future Trends in Solid Freeform Fabrication," *SPIE Proceedings of The International Society for Optical Engineering "Photonics East" Meeting*, Boston Mass., Nov. 1996, Vol. 2910.
32. **Weiss, L.E.**, Neplotnik, G., Prinz, F.B., Schultz, L., Padmanabhan, P, Krishnan, R., and Merz, R., "Shape Deposition Manufacturing of Wearable Computers," *1996 Solid Freeform Fabrication Symposium*, The University of Texas At Austin, August, 1996.
33. Fessler, J.R., Merz, R., Nickel, A.H., Prinz, F.B., and Weiss, L., "Laser Deposition of Metals for Shape Deposition Manufacturing," *1996 Solid Freeform Fabrication Symposium*, The University of Texas At Austin, August, 1996.
34. **Weiss, L.E.**, "Solid Freeform Fabrication Processes Overview," *Japanese Technology Evaluation Center and World Technology Evaluation Center Workshop on Rapid Prototyping in Japan and Europe*, ed. G. M. Holdridge, Washington, D.C., March 7, 1996.
35. Prinz, F.B., **Weiss, L.E.**, Amon, C., Beuth, J., "Processing, Thermal, and Mechanical Issues in Shape Deposition Manufacturing, *Proceedings of the 1994 Solid Freeform Fabrication Symposium*, The University of Texas At Austin, eds. Harris Marcus, J.J. Beaman, J.W. Barlow, D.L. Bourell and R. Crawford, August, 1995
36. Amon, C., Finger, S., Prinz, F., and **Weiss, L.**, "Modeling of Novel Manufacturing Processes," *Manufacturing Science and Engineering* (1994), American Society of Mechanical Engineers, New York, NY, pp. 535-546, Nov. 1994.
37. Merz, R., Prinz, F.B., Ramaswami, K., Terk, M. and **Weiss, L.E.**, "Shape Deposition Manufacturing," *Proceedings of the 1994 Solid Freeform Fabrication Symposium*, The University of Texas At Austin, eds. Harris Marcus, J.J. Beaman, J.W. Barlow, D.L. Bourell and R. Crawford, August 1994.
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Abstracts/Symposia (with Oral Presentation):

1. Miller E, Cooper G, , Lensie E, DeCesare G, Usas A, Losee J, Walker L, **Weiss L**, Campbell P, "Spatial Patterning of Cell Fate In Vitro and Tissue Formation In vivo Using Bioprinting," BMES 2008 Annual meeting, St. Louis MO, Oct. 2008
2. Cooper G, Miller E, Lensie E, DeCesare G, Usas A, Bykowski M, Huard J, **Weiss L**, Losee J, Campbell P. Spatial regulation of bone formation in vivo. Paper accepted for podium presentation at the annual meeting of the American Cleft Palate-Craniofacial Association, Scottsdale, AZ, April, 2009.
3. Snyder J, **Weiss L**, Shultz L, and Rozzi T, "A Cartridge Simulator For Testing End Of Life Of Service Indicators", International Society for Respiratory Protection, 14th International Conference, Dublin, Ireland, Sept. 2008
4. Miller, E.D., Campbell, P.G., Walker, L., and **Weiss L**, "A Systematic Approach to Bioprinting Growth Factor Gradients and Interpreting Cell Responses", Society For Biomaterials 2007 Annual Meeting and Exposition, Chicago, IL., April, 2007
5. Jadlowiec JA, Miller ED, Huard J, **Weiss L,** Waggoner A, Campbell PG. Bioprinted Arrays of Immobilized Growth Factors Direct Pattern Osteogenic and Myogenic Lineage Progression of Muscle-Derived Stem Cells, The Orthopaedic Research Society Annual Meeting, San Diego, CA- February 10-14, 2007
6. Jadlowiec, J.A., Miller, E.D., Huard, J., Weiss, L.E., Waggoner, A., Campbell, P.G. "Patterning of multiple cell lineages from a single stem cell population", The American Society of Cell Biology December 9-13, 2006. San Diego, CA.
7. Miller, E.D., Li, K., Jadlowiec, J.A., Fisher, G.W., **Weiss, L.E.**, Walker, L.M., Kanade, T., Huard, J., Waggoner, A., Campbell, P.G. "Engineering Cell Fate Using Inkjet Printed Growth Factor Patterns", *Society for Biomaterials*,April 26-29, 2006. Pittsburgh, PA.
8. Miller, E.D., Li, K., Jadlowiec, J.A., Fisher, G.W., **Weiss, L.E.**, Walker, L.M., Kanade, T., Huard, J., Waggoner, A., Campbell, P.G. "Engineering Cell Fate Using Inkjet Printed Growth

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11. Campbell P, Miller E, Jadlowiec J, Li K, Fisher G, **Weiss, L.**, Walker L, Kanade T., "Engineered cell fate using inkjet printed growth factor patterns on ECM substrate," *Gordon Conference-Signal transduction by engineered extracellular matrices*, June 2006
12. Jadlowiec JA, Campbell PG, Miller ED, **Weiss, L.E.,** Wagooner A, Huard J., "Engineered cell differentiation of muscle-derived stem cells in register with spatial patterns of BMP-2," *Tissue Engineering Annual Meeting*, April 2006
13. Jadlowiec JA, Miller ED, Huard J, **Weiss, L.E.**, Waggoner A, Campbell PG., "Complex persistent arrays of BMP-2 and FGF-2 regulate patterned cell fate of stem cells," *Endocrine Society*, June 2006
14. Kanade T, Li K, Miller E, **Weiss, L**, Campbell P., "Tracking of migrating and proliferating cells in phase-contrast microscopy imagery for tissue engineering" 1*0th IEEE International Conference on Computer Vision*, Beijing, Chine 2005
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16. Smith JD, Fisher GW, **Weiss LE**, Waggoner AS, Campbell PG., "Understanding CAM blood vessel response into fibrin constructs for improved TE therapy," *Mid-West Tissue Engineering Consortium*, Cleveland, OH- April 15-16, 2005
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31. Campbell, P.G., Schultz, L., Orban J., and **Weiss, L.E.**, "Controlled Deposition of fibrin, signaling molecules and cells via ink-jet printing," *Midwest Tissue Engineering Conferenc*e, Ann Arbor MI, April 2002
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2. Campbell, P., Smith, J., and **Weiss, L.**, Biocompatable polymers and methods of use (C.I.P OF US Application 10/391,458). Filed July, 2006 (*Patent Pending*)
3. Campbell, P., Sipe, D., **Weiss, L.,** Fisher, G., and Kumta, P., Biocompatable polymers and methods of use (P.C.T.) Filed July, 2006 (*Patent Pending*)
4. **Weiss, L.** and Campbell, P., "Methods and Apparatus for Preparing Biomimetic Scaffolds," *(Submitted 2003,* No. 20030175410, *Pending)*
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6. N. Krause, **L. Weiss**, K. Shimada, and T. Kanade, "Computer Aided Orthopedic Surgery" Inventors: U.S. Patent No. 6,711,432 (2004)
7. Krause, N. Mendicino, R., Shimada, K., Weiss, L, and Kanade, T., "Computer-Aided Bone Distraction" U.S. Patent No. 6,701,174 (2004)
8. **Weiss, L.**, Stivoric, J., Neplotnik, G., Cape, S., and Kasabach, C., "Multi-Functional Rotary Dial Input Device for Portable Computers," U.S. Patent 6,225,980 (2001)
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11. Reed, M., **Weiss, L.,** Feldman, M., and Wu, C., "Method and Apparatus for Drug and Gene Delivery," U.S. Patent No. 6,197,013 B1 (2000)
12. Reed, M. and **Weiss, L.**, "Micromechanical barb and method for making the same," Patent No. 5,676,850 (1997)
13. Reed, M. and **Weiss, L.**, "Tissue Connective Devices With Micromechanical Barbs," U.S. Patent No. 5,569,272 (1996).
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15. **Weiss, L.E.** and Prinz, F.B., "Method and Support for Creation of Objects by Layer Deposition," U.S. Patent No. 5,286,573 (1994).
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17. **Weiss, L.E.** and Prinz, F.B., "Automated System For Forming Objects By Incremental Buildup of Layers," U.S. Patent No. 5,301,863 (1994).
18. Prinz, F.B., **Weiss, L.E.**, and Siewiorek, D.P., "Electronic Packages And Smart Structures Formed By Thermal Spray Deposition," U.S. Patent No. 5,278,442 (1994).
19. Merz, R., Prinz, F.B., and **Weiss, L.E.**, "Method and Apparatus for Depositing Molten Metal," U.S. Patent No. 5,281,789 (1994).
20. **Weiss, L.E.** and Prinz, F.B., "Rapid Tool Manufacturing," U.S. Patent 5,189,781 (1992).
21. Prinz, F. B., **Weiss, L. E.**, and Adams, D., "Method And Apparatus For Fabrication Of Three Dimensional Articles By Spray Deposition Using Masks As Support Structures," U.S. Patent No. 5,203,944 (1992).
22. Prinz, F.B. and **Weiss, L.E.**, "Method And Apparatus For Fabrication Of Three-Dimensional Metal Articles By Weld Deposition," U.S. Patent 5,207,371 (1991).
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24. Nayar, S.K., **Weiss, L.E.**, and Sanderson, A.C., "Solder Joint Inspection System and Method," U. S. Patent No. 4,988,202 (1991).
25. **Weiss, L. E.** and Prinz, F. B., "Method And Apparatus For Fabrication Of Three Dimensional Articles By Spray Deposition," U.S. Patent No. 5,126,529 (1990).
26. **Weiss, L.E.**, Sanderson, A.C., and Nayar, S.K., "Fiber Optic Inspection System" U.S. Patent No. 4,876,455 (1989).
27. Zaremsky, M., **Weiss, L.E.**, and Mutschler, T.A., "Servo Robot Gripper" U.S. Patent No. 4,579,380 (1986).
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Technical Reports:

1. **Weiss, L.**, Schultz, L., and Miller, E., "Inkjet Deposition System With Computer Vision-Based Cailbrartion for Targeting Accuracy," Robotics Institute Technical Report, CMU-RI-TR-06-15V2A
2. Fussell, P.S, Patrick, E.P., Prinz, F.b., Schultz, L., Thuel, D.G., and **Weiss, L.E.**, "Sprayed Steel Tool for Permanent Mold Casting of Aluminum," The Engineering Design Research Center, Technical Report, EDRC-24-42-91
3. Fussell, P.S, Kirchner O.K.., Prinz, F.B., and **Weiss, L.E.**, "Controlled Microstructure of Arc Sprayed Metal Shells," The Engineering Design Research Center, Technical Report, EDRC-24-57-91
4. Cerrada, C., Ikeuchi, K., Weiss, L. and Reddy, R., "A 3D-Object Recognition System Intergrating Range-Image Processing and Rapid Prototyping," The Robotics Institute Technical Report, CMU-RI-TR-90-32
5. Kutay A. and **Weiss, L.**, "Economic Impact of Automation: The Case of Robotic Thermal Spraying," The Robotics Institute Technical Report, CMU-RI-TR-90-07
6. **L. Weiss**, E.L. Gurosz, F.B. Prinz, S. Mahalingham, and P.S. Fussell, "Rapid Prototyping of Tools," Robotics Institite Technical Report, CMU-RI-TR-89-25
7. **Weiss, L.E.**, "Dynamic Visual Servo Control of Robots," The Robotics Institute Technical Report, CMU-RI-TR-84-16
8. **Weiss, L.E.**, "Dynamic Visual Servo Control of Robots," The Robotics Institute Technical Report, CMU-RI-TR-84-16

Invited Talks/Workshops/Seminars:

1. "Robotic Assisted Tissue Engineering," Medical Imaging, Neural Engineering, and Robotics (MINER) Seminar Series, (Feb 2009)
2. "Plasma-Based Plastics," Innovation Works (August 2007)
3. "Plasma-Based Plastics," The Pittsburgh Life Sciences Greenhouse (Sept. 2007)
4. "Plasma-Based Plastics," Neurosurgery Grand Rounds, Walter Reed Army Hospital (Feb 2007)

5. "Robotic-Assisted Tissue Engineering," Foundations of Robotics Seminar, Carnegie Mellon, Feb 2007
6. "Robotic-Assisted Tissue Engineering," International Workshop for Biomanufacturing, Tsinghua Unversity, Beijing, China, June 2005
7. "Fountain of Youth, the Real Promise of Medical Robotics and Tissue Engineering," CMU's Lifelong Learning Series, March 2005
8. "Ink Jet Deposition of Polymers for Manufacturing Chemical Sensors" Air Force Office of Sponsored Research Annual Review for MURIs on Multifunctional Nanosenors, Lake View, August 2004
9. "Chemical Post Process Deposition – InkJet," National Institutes of Occupational Health and Safety, November 2003
10. "Chemical Post Process Deposition – InkJet," Air Force Office of Sponsored Research Annual Review for MURIs on Multifunctional Nanosenors, University Of California at Santa Barbara, August 2003
11. "Barriers to Tissue Engineering," NSF/DARPA/NIST sponsored World Technology Evaluation Center workshop on Additive/Subtractive Manufacturing, Washington, D.C., Feb. 2003
12. "Nanotechnology for Tissue Engineering," President Cohon's ICES Advisory Board, Oct 2002
13. "Solid Freeform Fabrication for Bone Tissue Engineering," CMU Undergraduate BME Seminar, Oct, 2002
14. "Novel Ink Jet Printing Applications," Eastman Kodak, Sept. 2002
15. "Computer-Assisted Surgery," The Food and Drug Administration, May, 2001
16. "From Solid Freeform Fabrication to Tissue Engineering," Second Workshop on Materials Opportunities in Layered Manufacturing Technologies, Manchester, UK, June, 2001
17. "Layered Manufacturing with Polymer/Ceramic Composites for Bone Tissue Engineering," ONR Materials Review P.I. Meeting, Woods Hole, May, 2000
18. "From Solid Freeform Fabrication to Tissue Engineering," UPMC's Pittsburgh Orthopaedic Tissue Engineering Symposium, April, 2000
19. "Tissue Engineering", Mechanical Engineering Senior Seminar, CMU, February, 2000
20. Joint Pitt/CMU Workshop on Science of Cell and Tissue Engineering, Jan. 2000
21. "Design of Biomaterial Structure," The Gordon Conference on Biomaterials and Tissue Engineering, Holderness, NH, August 1999
22. "Overview of Solid Freeform Fabrication Processes," CIMA Stanford, March 1999
23. "From Solid Freeform Fabrication to Tissue Engineering," 44th Annual Meeting of the Plastics Surgery Research Council, May, 1999
24. Rapid Prototyping and Tissue Engineering," Biomedical Engineering Seminar (42-200), Carnegie Mellon, Nov. 1999
25. "Rapid Prototyping and Tissue Engineering," Medical Devices class (42-744), Carnegie Mellon, Nov. 1998
26. "From Solid Freeform Fabrication to Tissue Engineering," Naval Research Laboratory, Alexandria, VA. Feb., 1999
27. DARPA Brainstorming Session on Solid Freeform Fabrication, Washington, D.C., Feb., 1999
28. "Rapid Prototyping and Tissue Engineering," Biomedical Engineering Seminar (42-100), Carnegie Mellon, Nov. 1999
29. "CMU's Bone Tissue Engineering Initiative," Presentation to the PTEI Board of Directors, Oct. 1998

30. “Bone Tissue Engineering,” To United Kingdom Tissue Engineering/Biotech Delegation Hosted by PTEI, Sept., 1998,
31. “Bone Tissue Engineering,” Osiris Therapuetics, Baltimore, Maryland, Sept 1998
32. “Direct Fabrication of Ceramic Components with SDM,” DARPA PI Meeting, Stanford, August, 1998
33. “Shape Deposition Manufacturing,” Office of Naval Research, Woodshole, MA May 1998
34. “Rapid Prototyping and Tissue Engineering,” Biomedical Engineering Seminar (42-100), Carnegie Mellon, Nov. 1998
35. “Shape Deposition Manufacturing,” Office of Naval Research, Woodshole, MA May 1997
36. “Thermal Modules,” DARPA Smart Module PI meeting, Scottsdale, AZ Feb., 1997,
37. “Desktop Manufacturing,” Seminar in GSIA for New Trends in Product Realization (45-875), Feb. 1997
38. NSF Workshop on Advanced Information Infrastructure for Solid Freeform Manufacturing, Stanford Feb. 1997
39. “Shape Deposition Manufacturing of Wearable Computers,” Plenary session, Solid Freeform Fabrication Symposium, The University of Texas At Austin, August, 1996
40. Panel member for “Rapid Prototyping In Japan and Europe”, Solid Freeform Fabrication Symposium, The University of Texas at Austin, August 1996
41. “Opportunities and Issues In Shape Deposition Manufacturing,” DARPA/ONR Solid Freeform Fabrication Program, National Academy of Sciences Study Center, Woods Hole, May, 1996
42. “Underwater Computers Built with Shape Deposition Manufacturing,” DARPA PI meeting on Tactical Information Assistants, April. 1996
43. I was selected as one of five academic panel members for the NSF/DOD sponsored JTEC/WTEC (Japanese Technology Evaluation Center and World Technology Evaluation Center) study on Rapid Prototyping in Japan and Europe. Along with representatives from government and industry, we studied rapid prototyping in Japan (Dec. 1995) and Europe (Oct. 1995). I was then selected to present the lead off technical presentation, summarizing our findings, at The Workshop on Rapid Prototyping in Japan and Europe, at The American Institute of Architects, Washington, D.C., March, 1996
44. “Wearable Computers Built with Shape Deposition Manufacturing,” DARPA PI meeting in Tactical Information Assistants, Nov. 1995
45. “Solid Freeform Fabrication Processes,” Plenary session, The NSF Workshop on Design Methodologies for Solid Freeform Fabrication, Carnegie Mellon University, June 6, 1995
46. DARPA Workshop on Complex Systems, Santa Fe, New Mexico, April, 1995
47. “Overview of Rapid Prototyping Processes,” Plenary session, NIST ATP Workshop on Motor Vehicle Manufacturing Technology, Carnegie Mellon University, July, 1994
48. “Shape Deposition Manufacturing,” Workshop on Rapid Prototyping, IEEE International Conference on Robotics and Automation, San Diego, CA, May 1994
49. “A Thermal Spray Approach To Rapid Prototyping,” Special Session at the ASM Thermal Spray Conference, Anaheim, CA., June 1993
50. “Thermal Shape Deposition,” MCAD Conference, University of Michigan, May 1993
51. “Rapid Tool Manufacturing,” IMS Consortium, United Technologies, Hartford, CT, Jan. 1993
52. “Rapid Prototyping,” Bosch Program, GSIA, Carnegie Mellon, July 1991, 1992,1993
53. “A Conceptual Framework For A 'Mask & Deposit' Thermal Spray Shape Deposition System”, DARPA Workshop On Manufacturing, Feb. 1991, Salt Lake City, Utah

54. "Review of Rapid Prototyping," Special NSF session at the ASME Winter Annual Meeting, Atlanta, GA, Dec. 1991
55. "Rapid Prototying," NATO Advanced Study Institute on Expert Systems and Robotics, Corfu, Greece, July 1990
56. "Rapid Tool Manufacturing," National Council of Manufacturing Sciences, Ann Arbor, MI., June 1990
57. "Rapid Tool Manufacturing Based on Stereolithography and Thermal Spraying," The Technical University of Aachen, West Germany, Sept. 1989.
58. "Rapid Tool Manufacturing Based on Stereolithography and Thermal Spraying", First Workshop on Solid Freeform Fabrication, University of Texas at Austin, August 1989.
59. "Adaptive Control of Robots Using Visual Feedback," International Federation of Automatic Control, Symposium on Robot Control, Barcelona, Spain Nov. 1985.
60. "Dynamic Sensor-Based Control of Robots with Visual Feedback," IEEE Workshop on Intelligent Control, Rensselaer Polytechnic Institute, August 1985.
61. "Dynamic Visual Servo Control of Robots," Westinghouse Workshop on Applications of Machine Vision, April 1985
62. "Force Control of Robots", XEROX Corp., Rochester, NY, June, 1985

Awards:

2008 Steven J. Fenves Award for Systems Research

Post Doctoral Mentor To:

Eric Miller, PhD., *Bioprinting* (2007-2008)
Jason Smith, Ph.D., *In Vivo Investigations of Biomimetic Matrices in a Chick Chorioallantoic Membrane Model* (2003-2005)
Janine Orban, PhD., *Biomaterials* (2000-2002)
Sean Bidic, M.D., *Bone Tissue Engineering* (1999)
Takahisa Okano, M.D., *Vascular Tissue Engineering* (1997-1999)
Kacey Marra, PhD., *Biomaterials* (1997-1999)
Jay Szem, M.D., *Bone Tissue Engineering* (1996-1998)
Martin Fasching, PhD., *Thermal Spray Shape Deposition* (1991-1992)

Ph.D. Advisor To:

- Bur Chu, Carnegie Mellon University, Department of Biomedical Engineering (Current)
- Kang Li, Carnegie Mellon University, Department of Electrical and Computer Engineering, "Large-Scale Stem Cell Population Tracking in Phase Contrast and DIC Microscopy Image Sequences," Takeo Kanade and Phil Campbell, co-advisors (May 2009).
- Eric Miller, Carnegie Mellon University, Department of Biomedical Engineering. "Inkjet Printing of Solid-Phase Growth Factor Patterns to Direct Cell Fate," Phil Campbell, co-advisor (October, 2007)
- Prakash Padmanabhan, Carnegie Mellon University, Department of Mechanical Engineering, "Process Planning For Quality In Shape Deposition Manufacturing," Susan Finger, co-advisor (May, 1996)

- Robert Merz, Technical University of Vienna, Department of Electrical Engineering, "Shape Deposition Manufacturing" Fritz Prinz, co-advisor (May 1994)
- Paul Fussell, Carnegie Mellon University, Department of Mechanical Engineering, "Sprayed Metal Shells For Tooling" Fritz Prinz, co-advisor (May 1994)

Ph.D. Committee Member for:

- Elmer Ker, Biology, "Engineering Artificial Stem-Cell Niches to Investigate the Self-Renewal and Expansion of Multipotent Stem-Cells," Advisor: Phil Campbell
- Shu Ying Kwan, Biology, "Tracking tissue remodelling in real time non-invasively, *in vivo,"* Advisor: Phil Campbell
- Laurel Kuxhaus, Bioengineering, University of Pittsburgh, "Development Of A Feedback-Controlled Elbow Simulator: Design Validation And Clinical Application," Advisor: J. Vipperman, 2008
- Emily Monahan, Mechanical Engineering, "Computer-Aided System For Arthroscopic Hip Surgery,' Advisor: Kenji Shmida, 2007
- Fernando Alfaro, The Robotics Institute, "A Telemetry-Based Implantable MEMS Strain Gage", advisor: Gary Fedder, 2007
- David Wang, Bioemdical Engineernig, "Sonic Flashlight," Advisor: George Stetten, 2007
- Daigo Tanaka, Biomedical Engineering, "Computerized Planning of Prostate Cryosurgery," Advisor, Yoed Rabin, 2007
- Alik Wedge, The Robotics Institute, "Conductive Polymer 'Molecular Wires' for Neuro-Robotic Interfaces", Advisor: Yoky Matsuoka, 2006
- Lopez, George, Department of Electrical and Computer Engineering, In Situ Fabricated Microdialysis Microchannels with Biofouling Prevention Employing Electrical Methods, Advisor: Gary Fedder, 2005
- Murat Gunay, Department of Mechanical Engineering, "Reconstruction of 3D Bone Geometry from 2D X-Ray Images," 2003, advisor: Kenji Shimada
- Nate Klingbeil, Department of Mechanical Engineering, "Residual Stress-Induced Warping And Interlayer Debonding In Layered Manufacturing," 1998, advisor: Jack Beuth
- Omead Amidi, Department of Electrical and Computer Engineering, "Fuzzy Helicopter Control With On-Line Rule Generation", 1996, advisors: Takeo Kanade and Chuck Thorpe
- Kevin Schmaltz, Department of Mechanical Engineering, "Thermal Modeling Of Droplet Deposition Using A Spectral Element Numerical Technique," 1996, advisor: Cristina Amon
- Takeshi Abe, Department of Electrical and Computer Engineering, "A Micromechanical Gas Flow Sensor", 1995, advisor: Michael Reed,
- Wayne Carriker, Department of Electrical and Computer Engineering, "A Rapid Prototyping System for Flexible Assembly," 1995, advisor: Pradeep Khosla
- Hongato Han, Department of Electrical and Computer Engineering, "A Micromechanical Fastening System and Its Applications," 1992, advisor: Micheal Reed
- John E. Bares, Civil Engineering, "Orthogonal Legged Walkers for Autonomous Navigation of Rugged Terrain," 1991, advisor: William Whittaker
- Peter V. Nagy, Mechanical Engineering, "Coordinated Compliant Motion Control for Multi-Legged Walking Vehicles on Rugged Terrain," 1991, advisor: Subas Desa

- Suzanne Liebowitz, E.C.E., "Optical Multisensor Processing for Object Recognition," 1989, advisor: David Casasent
- E. Levent Gursoz, M.E., "Expert Task Sequencing in Model Based Programming of Robots," 1986, advisor: Friedrich Prinz
- John J. Murray, E.C.E., "Computational Robot Dynamics," 1986, advisor: Charles Neuman

M.S. Thesis Advisor For:

- Brian Finamore, Electrical and Computer Engineering, “Biodegradable RF Coils,” (expected date of graduation; June 2010)
- Ahmed Nadeem, University of Pittsburgh, Department of Bioengineering, “A Drug Delivery Stent Fabricated With Micromachining,” Harvey Borovetz, MD, co-advisor (expected date of graduation; June 2000),
- Ted Podran, new Mech. E. student accepted for Sept., 1996
- Rahul Bhargava, Mech. E., "Automated Ejectability Analysis and Parting Surface Generation for Mold Tool Design", 1991
- David A. Simon, Department of Electrical and Computer Engineering "Self-Tuning of Robot Program Primitives," August, 1987

M.S. Committee Member For:

- Rowena Mittal, “A Feasibility Study on a Novel Platform for Optimizing the Properties of Biohybrid Hydrogel Biomaterials for Tissue Engineering Applications, BME, 2006, Advisor: Newell Washburn
- Sanna Gaspard, BME, “The Design of a Novel Distal Protection Filter and A In-Vitro Bench Top Model for the Evaluation of Distal Protection Devices For Carotid Artery Stenting”, 2005, Advisor: Ender Finol
- Vamsi Rani, BME, “Novel synthesis and characterization of carbonate substituted hydoxyapatite for non-viral gene delivery,” 2004, Advisor Prashant Kumta
- Robert M. Sturgill, E.C.E., Optical Morphological Processing", 1990, advisor: David Casasent
- Dhiraj Patak, E.C.E., "Automatic Synthesis of Control Logic for Discrete Manufacturing Processes," 1988, advisor: Bruce Krogh
- Brian Telfer, E.C.E., "Optical Associative Memories for Distortion-Invariant Pattern Recognition," 1987, advisor: David Casasent

Undergraduate/Masters Project Advisor To:

- Luke Xie (Mech E.), Manufacturing of Micro-Velcro for Medical Applications using Mechanical Micromachining, Undergraduate Research Project (42-560), 2005
- Benndt Trebo, Visiting Student Scholar, FH-Vorarlberg, Austria, Visual Basic Interface for Image Processing of Ink Jet Printed Drops, 2003
- Mary Chopard (CHE), Kerry Kravec (ECE), Pei-Shan Lee(CEE), and Rajasekaran Swaminathan (MSE), 39-606 Product Design class, A Handheld Inkjet Printer for Applying Tissue Engineered 3D Band-Aids, 2003
- Marta Baldassa (Biomed), Bioreactor for Tissue Engineering, 2003

- Tianyu Ching, ECE, Ink jet Deposition System for Manufacturing Chemical and Biological Sensors, 2002
- Mike Betler, Mechanical Engineering, Bioreactor for 3D Tissue Culture, 2001
- Andreas Schwarzhans, The Robotics Institute Master's Program, Fluoroscopic Image Unwarping, 2001
- Pauline Schlosser, Visiting Student Scholar, Ecole Normale Superieure de Cachan, France, An Adjustable External Fixator for Stabilizing Bone, 2001
- Andreas Stolfleth, Visiting Student Scholar, FH-Vorarlberg, Austria, Apparatus to Selectively Deposit 3D Fibrin Matrices, 2001
- Martin Reichman, Visiting Student Scholar, FH-Vorarlberg, Austria, An automated device to insert biodegradable connectors, 2000
- Kristopher Kriechbaum, Mechanical Engineering, Biodegradable micro-connectors, 1999
- Andreas Schwarzhans, Visiting Student Scholar, FH-Vorarlberg, Biodegradable micro-connectors, Austria, 1999
- Stephan Korner, Visiting Student Scholar, Swiss Federal Institute of Technology, Fabrication of SiNi Components for a Miniature Turbine Engine, 1999
- Michael Foster, Mechanical Engineering, Shape Deposition Manufacturing of ceramic structures, 1996
- Barry Kaplan, Psychology, Bone Tissue Culturing, 1996
- Pajman Danai, Chem. E., Bone tissue culturing, 1996
- Ruhul Queddes, Electrical Engineering, The University of Virginia, Intavascular ultrasonic imaging, 1995
- Chigdem Yaser, Electrical Engineering., PCB design for shape deposited wearable computers, 1995
- Ursula Sadiq, Materials Science, Embedded electronic structures, 1994
- Thomas Lerner, Electrical Engineering, Technical University of Vienna, A shape-deposited, multi-material bearing structure, 1992
- Christoph Pichler, Electrical Engineering, Technical University of Vienna, A shape-deposited, touch-sensitive switch, 1992
- Anne-Claire Kopp, Mechanical Engineering, Construction of a rapidly prototyed mouse for the Vu-Man heads up display, 1992
- David Sealfon, Mechanical Engineering, Tensile testing of thermally sprayed sample, 1992
- William Bryant, Physics, Effects of electrostatic charging in thermal spray distribution, 1990
- Robert Winter, University of Michigan, Computer Science Dept., Solid Reconstruction of CT Scans For Stereolithography Processing, 1989
- Burky Chiang, Electrical Engineering, Rapid Prototyping of Prosthetics From CT Scans, 1989
- Kurt Zimmerman, Electrical Engineering, Custom controller design for Mars Rover, 1989
- Richard Holzman, Manufacturing Engineering Program, A Methodology for the Producibility of Surface Mount Technology Printed Wiring Assemblies Using Design for Automated Assembly Principles, 1987
- James Green and Douglas Adler, Mechanical Engineering, Robotic Manipulators in Uncertain Environments, 1985
- Jack Delk, Electrical Engineering, Position and Velocity Decoders for Incremental Optical Shaft Encoders, 1985

- Lane Abrams, Electrical Engineering, Implementation of Force Feedback Control for the IBM 7565 Robot, 1985
- Don Hamilton, Electrical Engineering, An Optical Tracking Algorithm for the Motor-Pigtail Problem, 1984
- Steve Hoffman, Electrical Engineering, An Analytic Solution to Parts Jamming During Robotic Assembly Processes," 1984
- Adam DeBilles, Electrical Engineering, A General Introduction to the Data Translation DT2801 I/O System, 1984

Technical Committees:

- Working Group: ASME, Manufacturing Engineering Division Technical Committee on Biomanufacturing

Editorial Boards:

- Biofabrication (2008-present)
- Tissue Engineering, (1999-2008)

Corporate Co-Founder:

- CarMell Therapeutics Corporation, Pittsburgh, PA, Developers of blood plasma-based plastics
- Setagon, Inc., Charlottesville, VA, Developers of drug-delivery stents.
- Bonecraft, Inc., Pittsburgh, PA, Developers of computer-aided orthopedic surgery systems
- Infiniform, LLC, Palo Alto, CA, Manufacture of complex ceramic shapes.

Advisory Boards:

- Verimetra, Inc.
- Xactix, Inc.
- Nine Sigma, Inc.
- The Pittsburgh Tissue Engineering Initiative (1996-1997)

Consulting:

- BodyMedia, Inc., Pittsburgh, PA. (*Body Wearable Computers*) (2000-2001)
- Abbott Research, Pittsburgh, PA (*Manufacture of feminine hygiene product*) (2001)
- Shadyside Hospital of Pittsburgh, Research and Development Center for Cardiovascular Devices *(Emboli filters for stent procedures)* (2000)
- MSR Technologies *(micromechanism applications)* (1995 to 1998)
- University of Pittsburgh Medical Center, Dept. of Plastic Surgery *(bone distraction devices using shape memory alloys)* (1995)
- University of Pittsburgh Medical Center, Dept. of Cardiology *(coronary artery stents patterned with micoroprobes for transvascular drug delivery to inhibit restenosis)* (1995 to 1997)

- Shadyside Hospital of Pittsburgh, Research and Development Center for Cardiovascular Devices *(design for an intra-aortic vascular shunt for abdominal aneurysms)* (1994)
- Redzone Robotics *(next generation robot controller)* (1990)
- Shadyside Hospital of Pittsburgh *(design and construction of an angioplasty emboli filter for carotid and coronary artery dilation)* (1988)
- University of Pittsburgh School of Medicine, Department of Orthopedic Surgery *(design and implementation support for an experimental test-bed for a research project titled "Glenohumeral Stability: A Dynamic Biomechanical Model") (*1987)
- Digital Equipment Corporation *(evaluation of a prototype robot*) (1984)
- Siemens Corporation *(design and implementation of a servo controlled robot gripper)* (1984)
- Shadyside Hospital of Pittsburgh *(design and construction of a catheter for coronary artery dilation.* (1978)
- Children's Hospital of Pittsburgh *(design and construction of transcutaneous implantable device for the repair of patent ductus arterious)* (1976)
- Magee Women's Hospital of Pittsburgh *(computer signal processing of fetal heart rate data to access fetal breathing activity)* (1975)

Government Panels:

- WTEC (World Technology Evaluation Center) panel on Additive/Subtractive Processes in Europe (2003)
- Office of Naval Research MURI review panel on Rapid Prototyping (1999)
- JTEC/WTEC (Japanese Technology Evaluation Center and World Technology Evaluation Center) panel on Rapid Prototyping in Japan and Europe (1995 to 1996)
- NSF ERC Advisory Panel for selection of new ERCs (1994)

Review Journals for:

- ACTA Biomateriala
- Computer-Aided Design
- Tissue Engineering
- IEEE Transactions on Robotics and Automation
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Systems, Man, and Cybernetics
- IEEE Control Systems Magazine
- ASME Journal of Engineering for Industry
- The International Journal of Machine Vision and Applications
- The International Journal of Robotics and Automation
- SME Journal of Manufacturing Systems