

FULL CURRICULUM VITAE

I. Samuel Kinde Kassegne, PhD, PE

II. EDUCATION

A.

Institution	Year	Degree	Major Field
Anna University	1984	B.E. (First Class Distinction)	Civil Engineering
Middle East Technical University	1987	M.S.	Civil Engineering
Virginia Tech (VPI &SU)	1992	Ph.D.	Engineering Mechanics

B. Title of Dissertation

Layerwise Theory for FEA Analysis of Discretely Stiffened Laminated Cylindrical Shells, 1992. Advisor: Dr. J. N. Reddy.

III. TEACHING POSITIONS AND RANKS HELD

<u>Institution</u>	<u>Rank</u>	<u>Date</u>	<u>Major Subject</u>
San Diego State University	Assistant Professor	2005-Present	ME
UC Irvine	Lecturer/Visiting Sci.	2003-04	ME & Aerospace
UC San Diego Extension	Instructor	1999-2002	FEA
Addis Ababa University	Adjunct Faculty Member	01-04	Computer Science

IV. TEACHING EFFECTIVENESS

Curriculum Development and Teaching Innovations

1. Developed a new two-series MEMS (Micro-Electro-Mechanical Systems) course. This is a unique contribution where I developed detailed curriculum, laboratory, software as well as hardware to support a new 2-series course in MEMS (ME585 and ME/EE685). A unique accomplishment that is achieved in this two-part course work is the training of students in fundamental skills of computer-aided design, mask layout, engineering design methodologies, and fabrication technology. Further, with the help of start-up fund, along with my collaborator, Dr. Moon, I designed, supervised, equipped and launched a state-of-the-art 250 square feet Class 100 (2 um feature) Cleanroom that has enabled – for the first time in the university - microfabrication of devices. I also obtained two software very critical for teaching this course. One was CoventorWare which is CAD – computer aided design package – without which no meaningful study and implementation of MEMS could be carried out. The other one is FEMLAB which is used for simulating the behavior of these devices mathematically to optimize the final engineering design. The two software are integrated to the two courses and students trained in the use of these state-of-the-art software.

2.

3. Program Development in ME 495 – Mechanical and Thermal Systems Lab. Overhauled and revamped the course work with the addition of four brand new experiments and equipment. Removed two non-functioning experiments from the course. The class has now comprehensive components in the three key areas of mechanics, thermal systems and fluid systems.

4. Graduated 12 MS students since 2005. Additional 6 MS candidates are on track to defending

their theses by December 2008-February 2009. All these theses completed in my MEMS Research Lab originated as final design projects in ME585 and ME685 courses thereby incorporating my teaching efforts with real-life research activity. These graduates of my research lab has found employment related to their research in companies like Qualcomm MEMS Technologies (QMT), Arrayomics, Abbott Labs, Flow-Serve, Autosplice, and Gen-Probe. **One-fourth (25%) of these MS graduates from my lab are women.**

5. Mentored and supervised the senior design (capstone) project of 10 undergraduate students. By involving undergraduate students in hands-on engineering project, particularly in the new SDSU Cleanroom, I have managed to train them in HVAC (heating, ventilation, and AC), microfabrication, and semi-conductor technology in collaboration with companies in the San Diego area such as Cymer, ASML, etc. The students were highly motivated as these efforts directly contributed to our new MEMS Cleanroom.

Teaching Honors

Invited NSF workshop participant for *WEE'06: Workshop for the Advancement and Retention of Under-represented and Minority Engineering Educators*. 90 participants from nationwide engineering schools were invited for a 3-day workshop on March 5-8, 2006.

V. PROFESSIONAL GROWTH

Articles in Refereed Journals¹ (Total 21. 19 published, 2 under review)

1. **Kassegne**, S.K., Arya, B., Yadav, N., “*Numerical Modeling of the Effect of Histidine Protonation on DNA Hybridization and pH Distribution in Electronically Active Microarrays*,” Accepted, Journal of Sensors and Actuators, Part B. Chemical, Elsevier Science B.V, **2009**.
2. Morsi, K., Moon, K.S., **Kassegne**, S.K., Ugle, R., Villar, E., “*Novel Current-Activated Tip-based Sintering (CATS): Localization of Spark Plasma Sintering*”, Scripta Materialia, Volume 60, Issue 9, Pages 745-748, **2009**.
3. Chun, K.S. Wondimu, B., and **Kassegne**, S.K., “*Hybrid/Mixed Assumed Stress Element for Anisotropic Laminated Elliptical and Parabolic Shells*,” Journal of Finite Elements in Analysis and Design, Volume 45 (2009), pp 766-781, **2009**.
4. **Kassegne**, S.K. and Chun, K-S “*Buckling Characteristic of Multi-Laminated Composite Elliptical Cylindrical Shells*”, Accepted. ASC2008 Special Issue of Journal of Mechanics of Advanced Materials and Structures, **2009**.
5. Frank, M., Moon, K.S., **Kassegne**, S.K., “*PMN-PT Single Crystal Resonators for Gas Sensing*,” Under Review, Journal of Smart Materials and Structures. **2009**.
6. **Kassegne**, S.K., Paramesh, N., Harwood, N., “*Influence of Coriolis Force on DNA Migration and Hybridization in Compact Disk (CD) Microfluidics Platforms*,” Under Review. Journal of Microfluidics and Nanofluidics, Springer-Verlag.
7. Nguyen, B. and **Kassegne**, S.K., “*High-Current Density DC Magnetohydrodynamics (MHD) Micropump with Bubble Isolation and Release System*,” Journal of Microfluidics and Nanofluidics, Springer-Verlag, Volume 5, 383-393, January **2008**.

¹ In most papers published with students, I have done more than 70% of the work; but I had allowed them to appear as first-authors following a tradition common in some universities where PI is normally the last author.

8. Zhou, L., Sharma, S., and **Kassegne, S.**, “*Reconfigurable Microstrip Rectangular Loop Antennas Using RF MEMS Switches*,” *Microwave and Optical Technology Letters*, Vol. 50, No. 1, pp 252-256, **2008**.
9. Chun, K.S. **Kassegne, S.K.**, Park, W-T., “*Static Assessment of Quadratic Hybrid Plane Element Using Non-Conforming Displacement Modes and Modified Shape Functions*,” *Structural Engineering and Mechanics*, Vol. 29, No. 6, 643-658, **2008**.
10. Lemma, F, Denko, M.K. Tan, J., and **Kassegne, S.K.**, "Envisioning a National E-Medicine Network Architecture in a Developing Country: A Case Study," *Int. J. of Healthcare Information Systems and Informatics*, 3 (1), pp 44-62, Jan-Mar **2008**.
11. Patel, V, and **Kassegne, S.K.**, “*Electroosmosis and Thermal Effects in Magneto hydrodynamic (MHD) Micropumps using 3D MHD Equations*,” *Journal of Sensors and Actuators B: Chemical, Elsevier Science B.V.*, Volume 122, Issue 1, pp 42-52, **2007**.
12. **Kassegne, S.**, “*Development of a closed-form 3-D RBS beam finite element and associated case studies*,” *Journal of Engineering Structures, Elsevier*, Volume 29, Issue 7, Pages 1580-1595, July **2007**.
13. **Kassegne, S.K.**, "Proposed Considerations for Revision of EBCS-8:1995 for Conservative Seismic Zoning and Stringent Requirements for Torsionally Irregular Buildings", Published by EACE's Zede Research Journal, **2006**.
14. Chun, K.S., **Kassegne, S.K.**, and Park, Won-Tae, “*A New, Efficient 8-Node Serendipity Element with Explicit and Assumed Strains Formulations*,” *International Journal for Computational Methods in Engineering Science and Mechanics*, Vol. 6, pp 285-292, Dec **2005**.
15. Chun, K.S. and **Kassegne, S.K.**, "Low-Velocity Impact Dynamic Behavior of Laminated Composite Nonprismatic Folded Plate Structures," *ASCE Journal of Engineering Mechanics*, Vol. 131, Num 7, July **2005**.
16. **Kassegne, S.K.**, and Hailu, D.A., “*Multi-Point Constraint and Mixed element based approach for RBS and panel zone modeling*", *EACE Journal*, September **2004**.
17. Ying, H., Yang, JM., Hopkins, P., **Kassegne, S.K.**, Marcus, T., Foster, A., and Howard, H., "Separation of Simulants of Biological Warfare Agents from Blood by a Miniaturized Dielectrophoresis Device," *Journal of Biomedical Microdevices (BMMD)*, Vol. 5, 217-225, July **2003**.
18. **Kassegne, S.K.**, Reese, H., Hodko, D., Yang, JM., Sarkar, K., Smolko, S., Swanson, P., Raymond, D., Heller, M.J., and Madou, M.J., "Numerical Modeling of Transport and Accumulation of DNA on Electronically Active Biochips," *Journal of Sensors and Actuators B: Chemical*, Volume 94, pp. 81–98, Elsevier Science B.V, **2003**.
19. **Kassegne, S.K.** and Reddy, J.N., "Local Behavior of Discretely Stiffened Composite Plates and Cylindrical Shells," *Composite Structures*, Volume 41, pp. 13-26, **1998**.
20. **Kassegne, S.K.** and Reddy, J.N., "A Layerwise Shell Stiffener and Stand-Alone Curved Beam Element," *Asn. Journal of Structural Engineering*, Volume 2, Nos. 1 and 2, pp 1-14, **1997**.
21. **Kassegne, S.K.**, Wasti, T., "Analysis of Box Girders by the Nodal Section Method," *METU Journal of Natural and Applied Sciences*, Vol. 22, No 1, pp. 33-59, **1989**.

Chapters in Refereed Books (3)

1. Kassegne, S.K. and Arya, B., “*Genomics and DNA Microarrays*”, Invited Review Article, *Microfluidics and Nanofluidics Handbook*”, Accepted. Mitra, S.K., and Chakraborty, S. (editors), CRC Press/Taylor & Francis Group.

2. Nguyen, B. and Kassegne, S.K., "DNA Microarrays," Invited Review Article, Encyclopedia of Microfluidics and Nanofluidics, Dongqing Li (editor), Springer-veritag, **2008**.
3. Wong, S. and Kassegne, S.K., "Protein Microarrays," Invited Review Article, Dongqing Li (editor), Springer-veritag, **2008**.

Conference Proceedings² (19)

1. K. Morsi; K. Moon; S. Kassegne; R. Ugle; M. Patel, "Novel Current Activated Tip-based Sintering (CATS) of Advanced Materials", Meeting: 2010 TMS Annual Meeting & Exhibition, Proceedings Title: EPD Congress 2010: Materials Processing Fundamentals
2. Kassegne, S.K., Wondimu, B., Mazjoub, M., and Shin, J., "High-Efficiency Microarray of 3-D Carbon MEMS Electrodes for Pathogen Detection Systems," SPIE-ISOT Conference Proceedings, San Diego, CA, November **2008**.
3. Frank, M., Nguyen, T.T., Makau, F.M., Moon, K.S., Kassegne, S.K., "PMN-PT Single Crystal Resonators for Sensing Acetone Vapors," SPIE-ISOT Conference Proceedings, San Diego, CA, November **2008**.
4. Moon, K, Kassegne, S., Morsi, K., Yi, J., Beyene, A., "Low-cost Polymeric and Carbon-based Photovoltaic cells for Clean Energy Applications," The 5th International Congress of Nano-Bio Clean Tech 2008, October 27-30, San Francisco, CA.
5. Kassegne, S., "Lessons from Virtual Supervision of Engineering and Computer Science Graduate Students – Case of Addis Ababa Ababa University," 36th ASEE/IEEE Frontiers in Education Conference, San Diego, CA, October 28 – 31, **2006**.
6. Lemma, F, Denko, M.K. and Kassegne, S.K, "Hierarchical Model Based LAN Architecture & VSAT-based WAN for a National Telemedicine Network in a Developing Country," Proceedings of WCIT 2006, held in conjunction with WCC 2006, Santiago, Chile, August **2006**.
7. Wang, C., Taherabadi, L., Jia, G., Kassegne, S., Zoval, J., and Madou, M., "Carbon-MEMS Architecture for 3D Microbatteries," Proceedings of SPIE- Photonics Europe, Strasbourg, France, April **2004**.
8. Kassegne, S.K. and Sarkar, K., "Challenges in Computational Modeling of Gel Permeation Layers in BioMEMS Devices," Proceedings of the SIAM Conference on Computational Science and Engineering (SIAM CSE03), San Diego, CA, February 10-13, **2003**.
9. Kassegne, S.K., "Issues in Seismic Zoning and Proposed Reconsiderations in Seismic Building Codes in Ethiopia," Proceedings of the Joint EACE-AAU International Conference on Computational Mechanics, Structures and Earthquake Engineering (ICCMSE-2003), Addis Ababa, Ethiopia, January 9-10, **2003**.
10. Hailu, D., Zekaria, A., Kassegne, S.K., "A New Efficient Multiple-Node Constraint Approach for FEA Analysis of Radius-Cut RBS Moment Frames in Highly Seismic Areas," Proceedings of the Joint EACE-AAU International Conference on Computational Mechanics, Structures and Earthquake Engineering (ICCMSE-2003), Addis Ababa, Ethiopia, January 9-10, **2003**.
11. Kassegne, S.K., Reese, H., Swanson, P., Sarkar, K, and Madou, M.J., "A Micro Electro-Optical DNA Array Sensor," Full Paper Published in the Proceedings of the SPIE Conference on Smart Structures and Materials, San Diego, CA, March 17-21, **2002**.
12. Kassegne, S.K., Zoval, J., Maher, B., Whitten, R., and Madou, M.J., "Design Issues in SOI-Based High-Sensitivity Piezoresistive Cantilever Devices," Full Paper Published in the Proceedings of the SPIE Conference on Smart Structures and Materials, San Diego, CA, March 17-21, **2002**.

² Except 3, 7,12,15, and 18, all these are complete articles published as a proceedings.

13. Sarkar, K, Kassegne, S.K., and Madou, M.J., "*Characterization of Porous Membrane Elements in Microfluidics Devices*," 14th US National Congress of Theoretical and Applied Mechanics Conference, Blacksburg, Virginia, June 23-28, **2002**.
14. Kassegne, S.K. and Quarshie, S., "*Architecturing Multiphysics FEA/BEA Simulation Software: A Case of Micro Devices Simulation*," Proceedings of the Sixth U.S. National Congress on Computational Mechanics, Dearborn, Michigan, August **2001**.
15. Kassegne, S.K. and Quarshie, S., "*Object-Oriented Interactive Optimization Tool for Analysis and Design of Plates and Shells*," Proceedings of Fifth U.S. National Congress on Computational Mechanics, Denver, Colorado, August **1999**.
16. Kassegne, S.K., "*Second Order Effects in Building Structures with Partial and Multiple Diaphragms*," Proceedings of the 12th Engineering Mechanics Conference, La Jolla, California, May 17-20, **1998**.
17. Kassegne, S.K. and Donnadieu, A., "*Seismic Analysis of Buildings using the RAM Structural System*," Presented at the Mexican Society of Seismic Engineering Meet in Mexico City, Mexico, April 22, **1998**.
18. Kassegne, S.K. and Somanath, N., "*Analysis of Plates and Shells with Cut-outs Using Layerwise Theory*," 34th Conference of Structures, Dynamics and Materials (SDM), La Jolla, California, **1993**.
19. Kassegne, S.K. and Reddy, J.N., "*Analysis of Discretely Stiffened Laminated Cylindrical Shells*," *Proceedings of MEET'N'93*, University of Virginia, Charlottesville, Virginia, June **1993**.

Misc. Publications

1. Kassegne, S.K., Buriak, L., and Miller, A., "*Second Order Analysis of Building and Industrial Structures*," Structural Engineer, London, UK. February **2001**.

Publications in Process (3)

1. Kassegne, S.K., Majzoub, M., "*Device Physics and Interfacial Interaction of Organic MEMS/NEMS Based Bulk Heterojunction Photovoltaic Cell with 3D Graphite*", Manuscript under preparation.
2. Kassegne, S.K., Moon, K., Majzoub, M., "*Experimental Investigation of Organic MEMS/NEMS Based Bulk Heterojunction Photovoltaic Cell with 3-D Graphite Electrodes*", Manuscript under preparation.
3. Kassegne, S.K., Wondimu, B., Majzoub, M., and Shin, J., "*High-Efficiency Microarray of 3D Carbon MEMS Electrodes for Pathogen Detection Systems*," Manuscript under preparation.

Funded Research Grants (4+3)

External (4)

1. **Co-PI** – National Science Foundation, \$307,000, "*Novel Current-Activated Tip-Based Sintering*", July 2008-2011. (Dr. K. Morsi is the PI. Dr. Moon is the other Co-PI).
2. **PI** – San Diego Foundation., \$35,000.00, "*New Enabling Technology for Building-Side-, Auto-, and Cloth-Mountable Flexible Solar Cells using All-Polymer Approach*", July 09-June 10. (Dr. Moon and Dr. Morsi are my Co-PIs).
3. **PI** – AlphaTec Spine Inc., \$37,933.00, "*Epidural Thermal Posterior Annulpla*", June 06-Dec 07. (Dr. Moon is my Co-PI).

4. **Co-PI** – AMO Co., Ltd. Kyungkido, Korea. \$40,000.00, “*Polymer light emitting diode chip with 3-D powder-sintered electrodes*”, July 09-Dec 09. (Dr. Moon is the PI. Dr. Morsi is the other Co-PI).

Internal (3)

1. **PI** - CSUPERB (Biotechnology Funding Program in California), \$15,000.00, No Overhead equivalent of \$22,500. “*A New On-Chip Three-Dimensional Separator for High-volume and High-Efficiency Molecular Diagnostic Application & Pathogen Separations*”, Jan 08 - May 09.
2. **PI** - University Grants Program, SDSU, \$10,000.00, "Investigation of New Generation of All-Polymer Organic Photovoltaic Cells". Jan 09 - Jan 10.
3. **PI** - University Grants Program, SDSU, \$10,000.00, “*A New Three-Dimensional Manipulator of Biomolecules for High-Efficiency Molecular Diagnostic Application & Pathogen Separations*”, Jan 06 - Sep 06.

Pending Research Grants (5)

1. **PI** – **CAREER**: National Science Foundation, \$498,000, “*Fundamental Investigation of Interfacial Interaction in Carbon Electrodes and Organic Photoactive Polymers*”, Submitted in July 2008.
2. **PI** – Air Force Office of Scientific Research (AFOSR), DURIP 09 (Defense University Research Instrumentation Program). \$417,422, “*Micro System Measurement Instrumentation for New Highly Tunable Wide Bandwidth Resonant Frequency MEMS Accelerometers for Defense Related Research.*” Submitted in August 2008.
3. **PI** – City of San Diego and QUALCOMM Cleantech Initiative, \$50,000, “*Low-Cost Multi-layered High Photoactive Area 3D All Polymer Photovoltaic Cells*”, Submitted in August 2008. Dr. Moon and Morsi are CO-PIs.
4. **CO-PI** – California Energy Commission, EISG program, \$95,000, “*Feasibility Study of Low Cost Polymeric and Carbon Based Photovoltaic Cells*”. Dr. Moon is the PI. Dr. Beyene & Morsi are CO-PIs.

Awards and Honors

1. AISC Hot Product of the Year (1997) – Awarded by AISC (American Institute of Steel Construction) for RAMFrame™, the FE simulation program I wrote in 1994 -1996.
2. CIDA (Canadian International Development Agency) Fellowship – For undergraduate studies 1980-1984. Ranked first among 80 applicants.
3. 5 Patent Applications.
4. Registered Professional Engineer in the state of California (Reg. No. C59036). Valid in several states in the US.

VI. SERVICE TO THE UNIVERSITY AND THE COMMUNITY

Service to the University

1. Member of UCPC – University Copyrights and Patents Committee (Since March 2007)
2. Doctoral faculty in the Joint Doctoral Program with UCSD – Since April 2007
3. Doctoral faculty in the SDSU Computational Sciences Center – Since 2007
4. Mechanical Engineering MSME Graduate Program Committee, 05-Present
5. College of Engineering, Student Learning Outcomes Assessment Committee, 06-08.

6. Mechanical Engineering, Curriculum Committee, 06-Present
7. Mechanical Engineering, Faculty Search Committee, 06-07.

Service to the Community

Invited Lectures:

1. “*Protonation and Buffering in Histidine and their Effect in Promoting Nucleic Acid Hybridization in Electronically Active Electrochemical Systems,*” Mechanical Engineering department, UC Riverside, April **2008**.
2. “*MEMS Devices: Overview and Research and Commercialization Trends,*” Seminar, ME and ECE Departments, Bahir Dar University, Bahir Dar, ET, June **2008**.
3. “*Closed-form 3-D Beam FEA for Modeling Steel Buildings with RBS Moment Connections,*” Seminar, Civil Engineering Department, Addis Ababa University, July 15, **2007**.
4. “*Drift Increases in Special Moment Frames with RBS Elements and Stiffness Irregularities,*” Structural Engineers Association of California (SEAOC), Seismology Committee, Los Angeles, CA, August 9, **2003**.
6. “*Areas of Computational Interest in Panel Zone Deformation and RBS Connections*” – Seminar – University of North Carolina at Charlotte, Civil Engineering Department, Structures and Materials Group, Charlotte, NC, May 2, **2003**.
7. “*Trends in Computational Mechanics and Finite Element Methods*” – Mechanical and Civil Engineering Departments, Addis Ababa University, January **2002**.
8. “*Recent Advances in Computer-Assisted Structural Dynamics and Seismic Design*” – Eth. Civil Engineers Association, January **2002**.
9. “*Extensible Markup Language (XML) Localization Issues*” – Computer Science Department. Addis Ababa University, January **2002**.
10. “*Simulation Issues for MEMS and Nano Devices*” - Electrical and Mechanical Engineering Departments, Addis Ababa University, December **2000**.
11. “*Computational Methods and Finite Element Analysis for Earthquake Engineering*” - Civil Engineering Department, Addis Ababa University, December **2000**.

Service on Panels

1. NSF Panel Member for ECCS-EPDT Proposals. February **2008**.
2. NSF Panel Member, Renewal site visit to the NSEC *Center for Hierarchical Manufacturing (CHM)* at the University of Massachusetts, Amherst, on September 26-28, **2007**.
3. NSF Panel Member for NIRT Proposals in Hierarchical Nanomanufacturing – February 26, **2007**.
4. US CRDF (Civilian Research & Development Foundation) Cooperative Grants Program, **2001, 2007, 2008**.
5. CCAT Grants Program. **2007, 2008**.

Service for Professional Conferences

1. Symposium Co-Chair, SPIE International Symposium on Optomechatronic Technologies, (ISOT 2008), San Diego, CA, U.S.A, 17-19 November **2008**.
2. Program Committee Member, International Symposium on Ubiquitous Multimedia Computing (UMC-08), Hobart, Australia, October 13 - 15, **2008**.
3. Program Committee Member (Infrastructure), The IFIP World IT Forum (WITFOR), Addis Ababa, ET, August **2007**.

4. Co-organizer and Program Co-chairman, Mini-symposia on Computational Modeling of BioMEMS, SIAM Conference on Computational Science and Engineering (SIAM CSE03), San Diego, CA, February 10-13, **2003**.
5. Session chair, "Smart Structures and Integrated Systems - Control of Smart Structures," SPIE Conference on Smart Structures and Materials, San Diego, CA, March 20, **2002**.

Service in Journal Reviews

1. Journal of Sensors and Actuators, Part B. Chemical
2. Journal of Microfluidics and Nanofluidics
3. IEEE Journal of Selected Topics in Quantum Electronics
4. Journal of Materials Processing Technology
5. Journal of Engineering Structures