

BRANDON MURAMATSU

LEARNING • TECHNOLOGY • INNOVATION • SCALE
www.mura.org/projects/ • mura@mura.org

EDUCATION

- 1995 **Master of Science**
Mechanical Engineering
University of California, Berkeley
- Thesis: *The Design, Development, and Assessment of the Vibrating Beam Experiment Multi-media Instructional Courseware*
Advisor: Dr. Pamela Eibeck
- 1995 **Management of Technology Certificate**
Certificate from the College of Engineering and Haas School of Business
University of California, Berkeley
- 1993 **Bachelor of Science**
Mechanical Engineering
University of California, Berkeley

PROFESSIONAL HISTORY

2009-present Massachusetts Institute of Technology

- 2017-present *Associate Director, Special Projects, MIT Open Learning*
2015-2017 *Associate Director, Strategic Education Initiatives, Office of Digital Learning*
2014-2015 *Assistant Director, Strategic Education Initiatives, Office of Digital Learning*
2011-2014 *Senior Educational Technology Consultant, Office of Educational Innovation and Technology*
2009-2011 *Senior IT Consultant, Office of Educational Innovation and Technology*
- Completing a 4-year, multimillion-dollar education technology and curriculum development project in K-12 education in four states in India with 60,000 students, 3,300 teachers and 478 schools. (CLIX)
 - Led and managed a portfolio of multimillion-dollar education technology and curriculum development projects within a complex organization structure using influence and coordination to successfully complete multi-partner, team-based projects. (CLIX, CoLAB, Open Learning Scholars, Online Teacher Education)
 - Managed education technology and curriculum development projects in six countries: U.S., India, Uruguay, Egypt, Lebanon and Pakistan. (CLIX, CoLAB, Open Learning Scholars, Online Teacher Education)
 - Negotiated multimillion-dollar fee for service agreements with international universities and other organizations. (SRM, CoLAB)
 - Provided strategic consulting in contemporary learning technologies to organizations and countries exploring the development of new international universities.
 - Supported the transformation of a technology team from academic research to professional software development. (CLIX)

2004-2008 Utah State University

- 2005-2008 *Associate Director, Center for Open and Sustainable Learning*

- 2004-2005 *Project Director, Open Sustainable Learning Opportunities (OSLO) Group*
- Played leadership role in nurturing the then nascent international Open Educational Resources community. (OpenCourseWare (now Open Education) Consortium, OpenEd Conferences)
 - Co-founded a research center focused on open and sustainable learning.
 - Supported a high-performing team that demonstrated high velocity software development and the value of small pieces loosely joined.

1995-2004 University of California, Berkeley

- 1998-2004 *Project Director, SMETE.ORG*
- 1998-2004 *Project Director, NEEDS*
- 1995-1998 *Project Manager, NEEDS*
- 2001-2004 *Consultant, University of California Teaching, Learning and technology Center*
- 1995-2004 *Director, Berkeley Instructional Technology Studio*
- 1994-1999 *Instructor, Department of Mechanical Engineering*
- Conceived, designed and successfully developed two educational digital libraries, one for engineering education and one for STEM education. (NEEDS and SMETE.ORG)
 - Convened a national collaborative of over thirty STEM education digital libraries, professional societies and other partner organizations. (SMETE Open Federation)
 - Managed national award competition for outstanding engineering education courseware. (*Premier Award*)
 - Participated in the development of two international learning technology standards. (IEEE LOM)

2002-2004 California State University, Office of the Chancellor

- 2002-2004 *Director of Alliances, MERLOT*
- Developed alliances with partner organizations for MERLOT.
 - Promoted federated search (distributed) over union catalogs (centralized) for technical collaboration between educational digital libraries.

PROJECT FUNDING

- | | |
|--------------|---|
| \$1,332,171 | Total Funding Received as Principal Investigator |
| \$16,494,622 | Additional Funding as Lead Author or Project Lead |
| \$8,674,991 | Additional Funding as Co-Principal Investigator or Co-Lead Author |
| \$26,501,784 | Total Project Funding Received |
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- | | |
|------|---|
| 2019 | STEAM Lab School. Prime: MIT. Senior Personnel (and Lead Author). \$150,000 (Contract). Belize Ministry of Education, Youth, Sports and Culture. |
| 2018 | CoLAB. Prime: MIT. Senior Personnel (and Lead Author). \$3,055,150 (Contract). Centro Ceibál. |
| 2017 | SRM University. Prime: MIT. Senior Personnel (and Lead Author). \$1,396,700 (Contract). SRM University. |
| 2016 | Open Learning Scholars. Prime: MIT. Senior Personnel (and Lead Author). \$1,575,000 (Gift). Al-Ghurair Foundation for Education. |
| 2015 | Connected Credentials Whitepaper. Prime: American Council on Education. Senior Personnel (and Lead Author). \$2,000 (Sub-Contract). American Council on Education. |
| 2015 | Connected Learning Initiative. Prime: MIT. Senior Personnel (and Co-Lead Author). \$717,116. MIT Provost's Office. |

- 2015 *Connected Learning Initiative*. Prime: Tata Institute for Social Sciences. Senior Personnel (and Co-Lead Author). \$4,123,446. Tata Education and Development Trust / Jamsetji Tata Trust.
- 2015 *AIM Academy*. Prime: Research Foundation for The State University of New York. Senior Personnel (and Co-Lead Author). \$3,750,000 (Sub-contract, approximate MIT/online course portion only). Air Force Research Laboratory.
- 2015 *Innovative, Technology Enabled Learning Modules in Advanced Manufacturing: A Collaboration between MIT and the Transformation Agenda Consortium-Phase 3*. Prime: Quinsigamond Community College. Senior Personnel (and Lead Author). \$235,344 (Sub-Contract). U.S. Department of Labor.
- 2014 *Learning Sciences and Online Learning: Interaction and Influence for Quality Practice and Research*. Senior Personnel (and Lead Author). \$300,000. NSF DUE-1439272.
- 2014 *Innovative, Technology Enabled Learning Modules in Advanced Manufacturing: A Collaboration between MIT and the Transformation Agenda Consortium-Phase 2*. Prime: Quinsigamond Community College. Senior Personnel (and Lead Author). \$275,000 (Sub-Contract). U.S. Department of Labor.
- 2013 *Innovative, Technology Enabled Learning Modules in Advanced Manufacturing: A Collaboration between MIT and the Transformation Agenda Consortium*. Senior Personnel (and Lead Author). \$77,500 (Subcontract). US Department of Labor.
- 2013 *Piloting Contemporary Approaches to Online Teacher Education in Pakistan*. Senior Personnel (and Lead Author). \$700,000 (Subcontract). USAID.
- 2013 *MIT Collaboration with EDC to Develop an Online Teacher Education Program in Pakistan*. Prime: Education Development Center. Senior Personnel (and Lead Author). \$48,349 (Subcontract). USAID.
- 2013 *Proposal to Extend the 2.002 Modularity Experiment for Spring 2013*. Prime: MIT. Senior Personnel (and Lead Author). \$32,000. MIT Internal Funding: Mechanical Engineering Department and Office of Digital Learning.
- 2011 *Quality of Online Learning Summit at MIT*. Prime: MIT. Senior Personnel (and Lead Author). \$88,850. Bill and Melinda Gates Foundation.
- 2011 *Open Learning: Bridge to Success (B2S)*. Prime: MIT. Senior Personnel (and Lead Author). \$45,000 (Subcontract). Educause NextGen Learning Challenges/Bill and Melinda Gates Foundation.
- 2011 *CaPRÉT—Cut and Paste Reuse Tracking*. Prime: MIT. Senior Personnel (and Lead Author). \$16,000 (Subcontract). JISC.
- 2009 *Towards Improving Dissemination and Building Community for Course, Curriculum and Laboratory Innovations using the NSDL*. Prime: Virginia Tech. Consultant (and Lead Author). \$82,052. NSF DUE-0938513.
- 2007 *Where Have We Come From and Where are We Going? Learning the Lessons and Disseminating Exemplary Practices from the Projects of the NSDL*. Prime: Utah State University. Principal Investigator (and Lead Author). \$89,947. NSF DUE-0737821.
- 2007 *Utah OpenCourseWare Alliance*. Prime: Utah State University. Principal Investigator. \$200,000. Utah Legislative Appropriation.
- 2006 *Tool Stewardship for the Field of Open Educational Resources*. Prime: Utah State University. Co-Principal Investigator. \$1,800,000. William and Flora Hewlett Foundation.
- 2006 *A Set of Tools for Finding, Reusing, and Iteratively Improving Open Content*. Prime Utah State University. Co-Principal Investigator. \$410,000. Andrew W. Mellon Foundation.
- 2006 *Catalyzing the Development and Innovative Use of Open Educational Resources*. Prime: Utah State University. Co-Principal Investigator. \$370,000. William and Flora Hewlett Foundation.
- 2005 *Stimulating the Development and Effective Use of Open Educational Resources*. Prime: Utah State University. Co-Principal Investigator. \$1,500,000. William and Flora Hewlett Foundation.

- 2005 *Services to Link OpenCourseWare Repositories and the NSDL*. Prime: Utah State University. Principal Investigator (and Lead Author). \$690,000. NSF DUE-0532895.
- 2004 *Collaborative Proposal: Personal Collections: Enhancing the Utility of the NSDL*. Prime: Eduworks, Inc. Co-Principal Investigator. \$415,080. NSF DUE-0435084.
- 2003 *Fostering Reuse and Interoperability for the NSDL*. Prime: Eduworks, Inc. Co-Principal Investigator (also formerly Co-Principal Investigator via California State University Office of the Chancellor of \$30,000 Sub-Contract). \$429,911. NSF DUE-0333590.
- 2003 *CAUSEweb: A Digital Library of Undergraduate Statistics Education*. Prime: Ohio State University. Formerly Co-Principal Investigator on Sub-Contract to California State University Office of the Chancellor. \$100,000 (Sub-Contract). NSF DUE-0333672.
- 2002 *The NSDL Collaboration Finder: Connecting Projects for Effective and Efficient NSDL Development*. Prime: California State University Office of the Chancellor. Principal Investigator (and Lead Author). \$352,224. NSF DUE-0226277.
- 2002 *Scaling the Peer Review Process for National STEM Education Digital Library Collections*. Prime: California State University Office of the Chancellor. Senior Personnel (and Lead Author) on Sub-Contract to UC Berkeley. \$52,000 (Sub-Contract). NSF DUE-0226269.
- 2001 *Collaborative Project: Enhancing Interoperability of NSDL Collections and Services*. Prime: University of California, Berkeley. Senior Personnel (and Lead Author). \$1,000,000. NSF DUE-0127580.
- 2001 *Developing a Vision Support Planning Tool From Vision to Reality: NSDL PI Meeting*. Supplement to *Online Tutorial for Peer Reviewers: Scaling the Peer review of Digital Libraries*. Prime: California State University Office of the Chancellor. Senior Personnel. \$76,499 (Sub-Contract). NSF DUE-0085913.
- 2000 *Developing a Core Integration System for a National Science, Mathematics, Engineering, and Technology Education Digital Library at WWW.SMETE.ORG*. Prime: University of California, Berkeley. Senior Personnel (and Lead Author). \$846,616. NSF DUE-0085878.
- 1999 *Developing a Prototype National Digital Library for Science, Mathematics Engineering and Technology Education*. Prime: University of California, Berkeley. Senior Personnel (and Lead Author). \$400,000. NSF IIS-9980116.
- 1998 *NSF Action Agenda: Expanding the National Engineering Education Delivery System as the Foundation for an On-Line Engineering Education Community*. Prime: University of California, Berkeley. Senior Personnel (and Lead Author). \$800,000. NSF EEC-9872570.
- 1998 *Using the National Engineering Education Delivery System as the Foundation for Building a Test-Bed Digital Library for Science, Mathematics, Engineering and Technology Education*. Senior Personnel (and Lead Author). \$200,000. NSF IIS-9847106.
- 1997 *Expanding the National Engineering Education Delivery System and Quality Review of Courseware Beyond the Synthesis Coalition*. Supplement to Institutionalization, Evaluation, and Dissemination of Educational Innovations Developed through the Synthesis Coalition. Senior Personnel (and Lead Author). \$100,000 supplement to NSF EEC-9625456.

CONSULTING

- 2004-2012 *Consultant, Virginia Tech*
- Project management and CD-ROM production for *Premier Award for Excellence in Engineering Education Courseware* from 2004-2012 (see www.premieraward.org).
 - Workshop facilitation, report writing and developed and maintained NSDL-CCLI Dissemination project (see archived site at <http://www.einnovations.org/nsdl-ccli-dissemination/>) for the “Towards Improving Dissemination and Building Community for Course, Curriculum and Laboratory Innovations using the NSDL” NSF grant (2009-2010).

- 2010 *Consultant, Broad-based Knowledge*
- Strategy, reflection editing, and developed and maintained NSDL Reflections project (see archived site at <http://www.einnovations.org/nsdl-reflections/>).
- 2008 *Consultant, MIT*
- Authored pre-proposal to develop an international network for content, context and curriculum around open educational resources for MIT's Office of Educational Innovation and Technology.
- 2003-2005 *Consultant, Eduworks, Inc.*
- Provided strategic consulting on the design and development of the Personal Digital Library project.
 - Developed and maintained the Reusable Learning Project's website (see archived site at <https://www.einnovations.org/reusablelearning/>), and served as a presenter at project workshops.
- 2005 *Consultant, AccessExcellence*
- Metadata application profile development.
- 2001 *Consultant, American Association for the Advancement of Science*
- Community building for BiosciEdNet, a digital library for bioscience education.
 - Metadata application profile development.

ADVISORY BOARDS

- 2013-2015 OER Research Hub: Advisory Board Member
- 2007-2009 OpenContent Foundation: Board of Directors
- 2008 OpenCourseWare Consortium: (Founding) Board of Directors
- 2007-2008 Open High School of Utah: (Founding) Board of Governors
- 2003-2008 National Science Digital Library
- Policy Committee Member (2005-2008)
 - Content Standing Committee Secretary (2003-2005)
- 2002-2005 Exploratorium Online NSDL Project Advisory Board, Exploratorium, San Francisco, CA

TEACHING

- 2011 *Instructor, Harvard University Extension*
Co-instructor for EDUC E-107, Open Education Practice and Potential.
- 2007-2008 *Adjunct Instructor, Instructional Technology Department, Utah State University*
Instructor for INST 7820 Practicum in Instructional Technology required of Ph.D. students in the department.
- 2006-2008 *Guest Lecturer, Instructional Technology Department, Utah State University*
Guest lectured on budgeting and proposal preparation for INST 6760 Grantwriting.
- 2000 *Course Consultant/Course Chief Technology Officer, Haas School of Business, University of California, Berkeley*
Consultant/Chief Technology Officer, for Evening MBA course in New Product Development.
- 1994-1999 *Instructor, Department of Mechanical Engineering, University of California, Berkeley*
Courses taught: Mechanical Engineering 39C–Multimedia Case Studies of Engineering Design on the World Wide Web and Mechanical Engineering 139–Project Management of Multimedia Case Studies of Engineering Design.
- 1993-1995 *Graduate Research Assistant, Department of Mechanical Engineering, University of California, Berkeley*

Developed and evaluated the Vibrating Beam Experiment Instructional Support Courseware. The courseware supported one of the four experiments required of every senior mechanical engineering student in ME107A, a semester-long course.

SYMPOSIUMS AND CONFERENCES

Symposia

- 2018 Connected Learning Initiative Symposium: Co-Organizer/Organizing Committee while at MIT Open Learning
- 2015 Learning Sciences and Online Learning Symposium: Co-Organizer while at MIT Strategic Education Initiatives
- 2011 Quality of Online Learning Summit: Co-Organizer while at the MIT Office of Educational Innovation and Technology
- 2010 MIT-Haiti Symposium: Co-Organizer while at the MIT Office of Educational Innovation and Technology
- 2010 Dissemination of CCLI Educational Innovations: Co-Chair while at the MIT Office of Educational Innovation and Technology
- 2004 Participant Interaction in Digital Libraries (2004): Co-Chair while at Center for Open and Sustainable Learning

Conferences

- 2018-2020 Connected Learning Summit: Reviewer while at MIT Open Learning
- 2018-2019 Open Education Conference: Program Committee while at MIT Open Learning
- 2011 OpenCourseWare Consortium Global Conference: General Co-Chair while at the MIT Office of Educational Innovation and Technology
- 2004-2007 Open Education Conference: General Chair while at the Center for Open and Sustainable Learning, Utah State University
- 2001-2002 IEEE/ACM Joint Conference on Digital Libraries: Organizing Committee
- 1999 ACM Digital Library Conference: Networking Chair while at the University of California, Berkeley

EDUCATIONAL COURSEWARE

- 1997-2012 *Premier Award for Excellence in Engineering Education* CDs (CD and web production, see www.premieraward.org)
- 1997 Multimedia Case Studies of Engineering Design: MMCSWeb and CD (CD and web production)
- 1997 Virtual Disk Drive Design Studio (CD production and design consultant)
- 1996 Graphics Interactive (Design consultant and voice overs)
- 1995 Vibrating Beam Experiment Instructional Support Courseware (Design and development)

UNIVERSITY SERVICE

- 2013-2014 Streamlining Open Education and Production Workflows Working Group, Office of Digital Learning
- 2012-2013 Staff Support for Assessment Task Force, Office of Digital Learning, MIT
- 2010-present Staff Support for MIT Council on Education Technology, MIT

2007	Research Focus Group, Utah State University
2002	Learning Management System Subcommittee to the Educational Technology Committee of the E-Berkeley Initiative at University of California, Berkeley
1996	Staff Panel Presentation to the Chancellor Search Committee at University of California, Berkeley
1995-2001	Instructional Technology Program Courseware Developer Users Group at University of California, Berkeley
1994-1995	Instructional Technology Program Graduate Student Council at University of California, Berkeley
1994-1995	College of Engineering Commencement Committee at University of California, Berkeley
1992-1993	Department of Mechanical Engineering Undergraduate Study Committee at University of California, Berkeley
1992-1993	College of Engineering Undergraduate Study Committee at University of California, Berkeley

STANDARDS ACTIVITIES

2000-2008	<p>Institute of Electrical and Electronics Engineers, Learning Technologies Standards Committee</p> <ul style="list-style-type: none"> • Treasurer (2004-2008) and Webmaster (2007-2008) • Committee Member of 1484.12 Learning Object Metadata. Contributed to the development of 1484.12.1-2002 IEEE Standard for Learning Object Metadata. Contributing to the development of 1484.12.1-3 Draft Standard for—eXtensible Markup Language (XML) Schema Binding for Learning Object Metadata Data Model.
1997-2008	<p>IMS Global Learning Consortium.</p> <ul style="list-style-type: none"> • Contributing Member (1997-2004): Contributed to the development of the IMS Learning Object Metadata specification. • Developer Network Member (2008)

PROFESSIONAL AFFILIATIONS

1989-present	<p>American Society of Mechanical Engineers International, ASME, Lifetime Member</p> <ul style="list-style-type: none"> • San Francisco Professional Section (1993-2005) <ul style="list-style-type: none"> ○ Chair (1997-1999) ○ Treasurer (1999-2005 and 1996-1997) ○ College Relations Chair (2001-2005 and 1993-2000) ○ Honors & Awards Chair (2000-2005) ○ Webmaster (1998-2005) • University of California Berkeley, Student Section (1989-1993)
2014-2015	American Society for Engineering Education, ASEE
1993-2008	
1999-present	Institute for Electronics and Electrical Engineers, IEEE
1999-2001	Association for the Advancement of Computers in Education, AACE
1992-present	Pi Tau Sigma
1993-present	Engineering Alumni Society, University of California, Berkeley

Honors and Awards

2004, 2002 &	American Society of Mechanical Engineers Region IX, Webmaster Award
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2001
1999 American Society of Mechanical Engineers Old Guard Young Engineer of the Year, Runner-Up
1999 American Society of Mechanical Engineers Region IX, Young Engineer of the Year
1998 Distinguished Service Award, University of California, Berkeley
1993 Charles Mills Gayley Fellowship, University of California, Berkeley
1992-1993 San Francisco Section, American Society of Mechanical Engineers International Farbar Award
1992 Fellow in the Order of the Golden Bear, University of California, Berkeley

PUBLICATIONS & PRESENTATIONS
2019

1. Science Education Resource Center. NAGT/SERC Geoscience Education Infrastructure Meeting Synthesis Report. Final report from the November 3-5, 2019 Geoscience Education Infrastructure Planning Meeting at Carleton College, Northfield, MN.
2. Muramatsu, B. & D. Wiley. (2019). An Elephant in the OER Room: One Topic We Aren't Talking About. 2019 Open Education Conference. Phoenix, AZ. October 30- November 1, 2019.

2018

3. Stump, G., Delong, K., & B. Muramatsu. (2018, November). SRM University Training Session. Cambridge, MA. November 2018.
4. Muramatsu, B. (2018, August). Roundtable: Contemporary approaches to developing partnerships for large scale education initiatives. Connected Learning at Scale: An International Symposium. Mumbai, India. August 8-9, 2018.
5. Muramatsu, B., Perry, J., Klopfer E., Delong, K., Kumar, V. (2018). The Connected Learning Initiative in India. Connected Learning Summit. Cambridge, MA. August 1-3, 2018.
6. Stump, G., Delong, K., & B. Muramatsu. (2018, June). SRM University Training Session. Cambridge, MA. June 2018.
7. Muramatsu, B. (2018b, April). Quality OER at Scale in India: The Curriculum, Interactive Tools and Platforms of the Connected Learning Initiative. Open Education Global. Delft, Netherlands. April 24-26, 2018.
8. Muramatsu, B. (2018a, April). The Connected Learning Initiative Quality at Scale in India. MIT Day of Action. Cambridge, MA. April 17, 2018.

2017

9. Stump, G., Delong, K., & B. Muramatsu. (2017, November). SRM University Training Session. Online. November 28-30. 2017.
10. Muramatsu, B. (2017, November). Strategic Education Initiatives – MIT Open Learning. Presentation to AVDOT Study Committee. Cambridge, MA. November 27. 2017.
11. Muramatsu, B., Ball, J., Delong, K., Duffin, J. & B. Mosbacher. (2017) Open Embedded Assessments: Play, Author; Anywhere, Anytime. 2017 Open Education Conference. Anaheim, CA. October 11-13, 2017.
12. Stump, G., Delong, K., & B. Muramatsu. (2017, June). SRM University Training Session. Online. October 5-11. 2017.
13. Muramatsu, B., Kumar, V., Farah, S., Stump, G., Delong, K. & Jalbout, M. (2017) Open Learning Scholars Design Camp. Cairo, Egypt. September 29, 2017 – October 1, 2017.
14. Muramatsu, B., Stump, G. & K. Delong. (2017, June-July). SRM University Training Session. Online. June-July 2017.
15. Muramatsu, B., Kumar, V., Farah, S., Doyle, D., Jalbout, M., & G. Stump. (2017) Open Learning Scholars Workshop. Dubai, United Arab Emirates. February 20-22, 2017.

2016

16. Muramatsu, B. (2016). Connected Learning Initiative: Open at Scale. OER16. Edinburgh, Scotland. April 19-20, 2016.
17. Ganzglass, E., Everhart, D., Hickey, D., Casilli, C., & Muramatsu, B. (2016). Quality Dimensions for Connected Credentials. *Washington, DC: American Council on Education*. †

2015

18. Muramatsu, B. & R. Sahu. (2015). CLIX Connected Learning Initiative. 2015 Open Education Conference. Vancouver, British Columbia, Canada. November 18-20. 2015.

19. Allen, D., Merriman, J., Muramatsu, B., Raymond, D., & M. Reilly. (2015). DXtera. Grantmakers for Education. San Francisco, CA. October 22-23, 2015.
20. Muramatsu, B. & L. Rosenheck. (2015). Evaluating and Selecting Digital Learning Resources. MIT-Haiti Workshop. Cambridge, MA. September 15, 2015.
21. Muramatsu, B. (2015, April). CLlx Technology Presentations. Presented at Connected Learning Initiative April 2015 Workshop, Mumbai, India. April 25-28, 2015.
22. Muramatsu, B. and Rankin, J. (2015). MIT Independent Activities Period Education Technology Workshop. January 2015.

2014

23. Muramatsu B. and Pinch, P. (2014). The Best of Both Worlds: Transforming OpenCourseWare in the age of Interactivity. Presented at OpenEd 2014: Washington, D.C. November 20, 2014.
24. Muramatsu, B. (2014, October). Innovative Educational Technology and Educational Infrastructure at MIT. Presentation to Air University, Cambridge, MA. October 15, 2014.
25. Muramatsu, B. (2014, September). Strategic Education Initiatives. September 2014.
26. Muramatsu, B. and Kumar, V. (2014). Education Technology Workshop. Presented at King Fahd University of Petroleum and Minerals: Dhahran, Saudi Arabia. August 25-27, 2014.
27. Muramatsu, B., Merriman, J. & Shaw, C. (2014, August). Backstage: What's Behind the Curtain. Presentation at Learning with MOOCs: A Practitioner's Workshop: Cambridge, MA. August 13, 2014. [Slideshow, PowerPoint, PDF]
28. Muramatsu, B. and Merriman, J. (2014, June). Backstage. Poster at edX Global Forum, TU Delft: Delft, Netherlands. June 5-6, 2014.
29. Muramatsu, B., Wiley, D., Ball, J. & Duffin, J. (2014, April). Open Embedded Assessment. Presented at OER14, Newcastle, UK. April 29, 2014. [Presentation: Slideshare, PowerPoint, PDF || Video: YouTube || Abstract: OER'14 Website, PDF]
30. Muramatsu, B. and Shaw, C. (2014). Video Concept Browser at MIT. Presented at the Matterhorn Unconference at Harvard University: Cambridge, MA. March 20, 2014.
31. Muramatsu, B. (2014, January). Innovative Online Strategies at MIT. Presented a NASA/MIT/NSTA Collaboration Meeting: Washington, D.C. January 24, 2014.

2013

32. Muramatsu, B., Ball, J., Duffin, J. & Wiley, D. (2013, November). Opening up assessment: Open tools and services. Presented at OpenEd 2013, Park City, UT. November 7, 2013. [Presentation: [Slideshare](#), [PowerPoint](#), [PDF](#) || Video: [YouTube](#)]
33. Muramatsu, B. (2013, October). Online course design. Invited presentation at Kyoto University, Kyoto, Japan, October 2, 2013. [[Slideshare](#), [PowerPoint](#), [PDF](#)] †
34. Merriman, J. & Muramatsu, B. (2013). MIT Core Concept Catalog (MC3). Workshop presented to the EDC Pre-STEP Program. Lahore: Pakistan, September 17, 2013. [[PowerPoint](#), [PDF](#)]
35. Muramatsu, B., Ludgate, H., et al. (2013) Online Course Design Guidelines. [[PDF](#)]
36. Muramatsu, B. (2013). Online Course Design Guidelines Workshop. Workshop presented to the EDC Pre-STEP Program. Lahore: Pakistan, September 16, 2013 [[Slideshare](#), [PowerPoint](#), [PDF](#)]
37. Kumar, V. & Muramatsu, B. (2013b, September). Administrative and Infrastructure Issues for Online Courses. Workshop presented to the EDC Pre-STEP Program. Lahore: Pakistan, September 15, 2013. [[Slideshare](#), [PowerPoint](#), [PDF](#)]
38. Kumar, V. & Muramatsu, B. (2013a, September). Contemporary Educational Technologies: A Perspective from MIT. Workshop presented to the EDC Pre-STEP Program. Lahore: Pakistan, September 14, 2013. [[Slideshare](#), [PowerPoint](#), [PDF](#)]

39. Muramatsu, B. (2013, June 19). The “Other” EdTech “Stuff” at MIT. Plenary presentation at LINC 2013: Cambridge, Massachusetts, June 19, 2013. [Presentation: [Slideshare](#), [PowerPoint](#), [PDF](#), [PDF with Notes](#) | | Video: [TechTV](#)]
40. Muramatsu, B. (2013, April 22). Rethinking Learning: Course Consumption & 21st Century Learning. Presentation at Harvard Business Publishing: Watertown, Massachusetts, April 22, 2013. [[PowerPoint](#), [PDF](#), [PDF with Notes](#), [Slideshare](#)]
41. Muramatsu, B. (2013, April 11). Publishing MOOCs: A Conversation with Institutions Publishing Massive Open Online Courses. Panel Member at NERCOMP: DIY Publishing and the University: Norwood, Massachusetts, April 11, 2013.
42. Muramatsu, B. (2013, January 28). Transforming Courses to Concepts. Presentation at New Horizons on Teacher Education Symposium: Islamabad, Pakistan, January 28, 2013. [[PowerPoint](#), [PDF](#), [Slideshare](#)]

2012

43. Muramatsu, B. (2012, June). iCampus Prize: Five Minutes of Fame. Presentation at 2012 NMC Summer Conference: Cambridge, MA, June 14, 2012. [Presentation: [PowerPoint](#), [PDF](#), [PDF with Notes](#), [Slideshare](#) | | Video: [YouTube](#)]
44. Muramatsu, B. (2012, June 13). CourseRoad, Dormbase win 2012 icampus student prizes. Retrieved from <http://due.mit.edu/news/2012/courseroad-dormbase-win-2012-icampus-student-prizes>
45. Muramatsu, B. (2012, May 23). CourseRoad, Dormbase win 2012 icampus student prizes. Retrieved from <http://web.mit.edu/newsoffice/2012/2012-icampus-student-prize.html>
46. Kamrin, K., Reis, P. and Muramatsu, B. (2012, May 11). i2.002 Experience. Presentation at MIT Mechanical Engineering Department Faculty Meeting, May 11, 2012.
47. Muramatsu, B. (2012, April). OEx: OpenEducation-x. Invited presentation at Tacoma Community College. April 27, 2012. [[Slideshare](#), [PowerPoint](#), [PDF](#), [PDF with Notes](#)]
48. Law, P., McAndrew, P., Law, A., Warner, K., Runyon, J., Lascu, D., Arundel, A. and B. Muramatsu. (2012). A bridge to success. In: Cambridge 2012: Innovation and Impact – Openly Collaborating to Enhance Education, a joint meeting of OER12 and OpenCourseWare Consortium Global 2012, 16-18 Apr 2012, Cambridge, UK.
49. Muramatsu, B. (2012, March). From OpenCourseWare to Open Content. MIT-Haiti Workshops on Technology-Enhanced and Open Education, Port-au-Prince, Haiti. [[Slideshare](#), [PowerPoint](#), [PDF](#)]
50. Muramatsu, B. (2012, February). Finding Resources for The MITCET Chemistry Bridge Project. [[Slideshare](#), [PowerPoint](#), [PDF](#)]
51. Muramatsu, B. & Runyon, J. (2012, February). Landscape of the Future: Open Content, Open Knowledge, Open Sharing. Presented at eLearning 2012, Long Beach, CA. February 20, 2012. [[Slideshare](#), [PowerPoint](#), [PDF](#)]
52. Muramatsu, B. & Runyon, J. (2012, February). Demystifying Open Educational Resources. Workshop at eLearning 2012, Long Beach, CA. February 18, 2012. [[Slideshare](#), [PowerPoint](#), [PDF](#)]
53. McAndrew, P., Muramatsu, B. & Runyon, J. (2012, February). Open Learning: Bridge to Success. Presented at ELI 2012 Online, Austin, TX. February 14, 2012. [[Slideshare](#), [PowerPoint](#), [PDF](#)]
54. McAndrew, P., Muramatsu, B. & Runyon, J. (2012, February). Bridge to Success: Learning to Learn and Succeed With Math. Presented at NGLC Wave I Convening, Austin, TX. February 12, 2012. [[Slideshare](#), [PowerPoint](#), [PDF](#)]

2011

55. Muramatsu, B. & Elliot-Cirigottis, G. (2011, October). Bridging the Gap: Mixing approaches, content and tools to help college students. Presentation at Presented at OpenEd 2011, Park City, UT. October 25, 2011. [Presentation: [Slideshare](#), [PowerPoint](#), [PDF](#), [PDF with Notes](#), [Keynote](#) | | Video: [YouTube](#)]

56. Tront, J., McMartin, F. & Muramatsu, B. (2011, October 15). Work in Progress – Improving the Dissemination of CCLI (TUES) Educational Innovations. Proceedings of the IEEE/ASEE Frontiers in Engineering Education, Rapid City, SD, October 12-15, 2011. [Presentation: PowerPoint, PDF || Paper: PDF] †
57. Muramatsu, B., Runyon, J. & McAndrew, P. (2011, September 20). Demystifying Open Educational Resources. Instructional Technology Council Webinar. [Webinar: Archive || Presentation: Slideshare, PDF]
58. Muramatsu, B. (2011, August 30). Perspectives on Dissemination and Adoption of Educational Innovations in STEM. [Slideshare, PDF]
59. McAndrew, P., Muramatsu, B. & Runyon, J. (2011, August 23). Using Openness to Bridge to Success. NextGen Learning Challenges Summer Learning Series. [Webinar: Archive || PDF]
60. Muramatsu, B. (2011, May 12). From OpenCourseWare to Open CourseWare. Presentation at OER'11: Manchester, UK, May 12, 2011. [Slideshare, PowerPoint, PDF]
61. Muramatsu, B. and Schmidt, P. (2011, May 6). Transforming OpenCourseWare to Open CourseWare. Presentation at OCWC Global 2011: Cambridge, MA, May 6, 2011. [no presentation available]

2010

62. Muramatsu, B. (2010, December 1). OER Search. Prepared for Google OER Search Meeting: Mountain View, CA, December 1, 2010. [Slideshare, PowerPoint, PDF]
63. Muramatsu, B. & Caswell, T. (2010, November 3). Plagiarism is Good: Moving from Access to Use as Metrics for OCW/OER Use and Reuse. Presentation at Open Education 2010 Conference: Barcelona, Spain, November 3, 2010. [Presentation: Slideshare, PowerPoint, PDF, PDF with Notes || Video: YouTube]
64. Muramatsu, B. (2010, November 2). Project Greenfield: A New Way of thinking about MIT OpenCourseWare. Presentation at Open Education 2010 Conference: Barcelona, Spain, November 2, 2010. [Presentation: Slideshare, PowerPoint, PDF, PDF with Notes || Video: YouTube]
65. Muramatsu, B., McKinney, A., Wilkins, P., (2010, July 1). Implementing SpokenMedia for the Indian Institute for Human Settlements. Presentation at Technology for Education Conference: Mumbai, India. July 1 2010. [Presentation: Slideshare, PowerPoint, PDF, PDF with Notes || Paper: PDF, DOC || Video: MOV, 230MB] †
66. Muramatsu, B., McKinney, A., Wilkins, P., (2010, May 7). Opening Up IHS Video with SpokenMedia. Presentation at OCW Consortium Global 2010 Conference: Hanoi, Vietnam. May 7, 2010. [Presentation: Slideshare, PowerPoint, PDF, PDF with Notes || Paper: PDF, DOC || Video: Video]
67. Muramatsu, B., Kumar, M.S., Merriman, J. & Wilkins, P. (2010, May 5). Project Greenfield: A New Way of thinking about OpenCourseWare and Open Educational Resources for MIT. Presentation at OCW Global 2010 Conference: Hanoi, Vietnam, May 5, 2010. [Presentation: Slideshare, PPT, PDF || Paper: PDF, DOC]
68. Muramatsu, B., McKinney, A., Wilkins, P., (2010, April 9). SpokenMedia Project: Enabling Rich Media Notebooks for Learning and Teaching. Poster at 2009 Hewlett Grantees Meeting: Yale University, New Haven, CT. April 9, 2010. [Poster: PDF]
69. Muramatsu, B., McKinney, A., Wilkins, P., (2010, March 23). Improving the OER Experience: Enabling Rich Media Notebooks of OER Video and Audio. Presentation at OER10: Cambridge, UK. March 23, 2010. [Slideshare, PowerPoint, PDE, PDF with Notes]
70. Muramatsu, B., Merriman, J., Kumar, V. (2010, March 22). Towards a Network of Content and Curriculum: Interoperability of OER Projects. Presentation at OER10: Cambridge, UK. March 22, 2010.
71. Muramatsu, B., McKinney, A., Wilkins, P., (2010, March 9). SpokenMedia: Automatic Lecture Transcription and Rich Media Notebooks. Presentation at NERCOMP 2010: Providence, Rhode Island. March 9, 2010. [Slideshare, PowerPoint, PDF, PDF with Notes]

72. Muramatsu, B., (2010, January 7). IIHS Open Framework-Linking Content And Curriculum. Presentation at the Indian Institute for Human Settlements Curriculum Conference: Bangalore, India. January 7, 2010. [[Slideshare](#), [PowerPoint](#), [PDF](#)]
73. Muramatsu, B., McKinney, A. & Wilkins, P. (2010, January 6). IIHS Open Framework-SpokenMedia. Presentation at the Indian Institute for Human Settlements Curriculum Conference: Bangalore, India. January 6, 2010. [[Slideshare](#), [PowerPoint](#), [PDF](#), [PDF with Notes](#)] †

2009

74. Muramatsu, B. & McKinney, A. (2009, October 14). SpokenMedia: Automatically Transcribing Lectures for Improved Discoverability and Engagement. Presentation at the EdTech Fair: Cambridge, MA. October 14, 2009.
75. Muramatsu, B., (2009, August 12). SpokenMedia: Content, Content Everywhere...What video? Where?: Improving the discoverability of OER video and audio lectures. Open Education 2009, Vancouver, British Columbia, Canada. August 12, 2009. [Presentation: [Slideshare](#), [PowerPoint](#), [PDF](#), [PDF with Notes](#) | Video: [YouTube](#)]
76. Muramatsu, B., McKinney, A., Long, P.D., and Zornig, J. (2009, August 6). SpokenMedia Project: Media-Linked Transcripts and Rich Media Notebooks for Learning and Teaching. Presented at the IEEE Computer Society Bangalore Section. August 6, 2009. [[Slideshare](#), [PowerPoint](#), [PDF](#), [PDF with Notes](#)] †
77. Muramatsu, B. McKinney, A., Long, P.D. & Zornig, J. (2009). [SpokenMedia project: Media-linked transcripts and rich media notebooks for learning and teaching](#). Technology for Education, 2009. T4E '09. International Workshop on [Technology for Education]. pp.6,9, 4-6 Aug. 2009. doi: 10.1109/T4E.2009.5314124 [[Download](#)]
78. Muramatsu, B., McKinney, A., Long, P.D., and Zornig, J. (2009, August 4). SpokenMedia Project: Media-Linked Transcripts and Rich Media Notebooks for Learning and Teaching. 2009 Technology for Education Workshop: Bangalore, India. August 4, 2009. [Presentation: [Slideshare](#), [PowerPoint](#), [PDF](#), [PDF with Notes](#) | | Paper: [PDF](#), [DOC](#)]
79. Muramatsu, B., McKinney, A., Long, P.D. & Zornig, J. (2009, June 12). Building Community for Rich Media Notebooks: The SpokenMedia Project. 2009 New Media Consortium Summer Conference, Monterey, CA. June 12, 2009. [[Slideshare](#), [PowerPoint](#), [PDF](#)]
80. McKinney, A., Muramatsu, B., Long, P.D. & Zornig, J. (2009). SpokenMedia. Poster at the AcademiX Conference, Duke University, Durham, NC. May 28, 2009. [Poster: [PDF](#)]
81. Merriman, J. and Muramatsu, B. (2009, May). Educational Innovation & Technology at MIT. Invited keynote at the Moodle Share Faire, Framingham, MA. May 28, 2009. [[Slideshare](#), [PowerPoint](#), [PDF](#)]
82. Muramatsu, B. (2009, April). Automated Lecture Transcription. Presented at the OpenCourseWare Global Meeting. Monterrey, Mexico. April 22, 2009. [[Slideshare](#), [PowerPoint](#), [PDF](#)] †
83. Muramatsu, B., Zornig, J., & McKinney, A. (2009, March). Automated Lecture Transcription. Presented at the AcademiX Conference, MIT, Cambridge, MA. March 26, 2009. [[Slideshare](#), [Keynote](#), [PDF](#)]

2008

84. NISO. (2008). NISO Thought Leader Meeting on eLearning and Course Management Systems: Executive Summary with Recommendations. Report of the July 11, 2008 Meeting. [Report: [PDF](#)]
85. Duffin, J. & Muramatsu, B. (2008). OER Recommender: Linking NSDL Pathways and OpenCourseWare Repositories. 2008 Joint Conference on Digital Libraries, Pittsburgh, PA. [Poster: [PDF](#) | | Abstract: [PDF](#)] †
86. Muramatsu, B. (2008). COSL & OEIT. Presentation at the MIT Office of Educational Innovation and Technology, Cambridge, MA. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]

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87. Muramatsu, B., Ball, J., Duffin, J., Wiley, D., Gray, J., Godwin, A., Reedstrom, R., Cooper, C. & Whipkey, C. (2008). Open Educational Resources Interoperability Sprint Outcomes: Linking OER Providers. Paper presented at OpeniWorld: Europe 2008, Lyon, France. [Presentation: [PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)] | Paper: [PDF](#), [DOCX](#), [DOC](#)]

2007

88. Duffin, J., Muramatsu, B. & Henson Johnson, S. L. (2007). OER Recommender: A recommendation system for open educational resources and the National Science Digital Library. White paper funded by the Andrew W. Mellon Foundation for the Folksemantic.org project. (Updated March 7, 2008). †
89. Muramatsu, B., Duffin, J. & Ball, J. (2007). Linking NSDL and OpenCourseWare repositories. Poster at 2007 NSDL Annual Meeting. [Poster: [PDF](#)]
90. Henson, S., Ball, J., Wiley, D. and Muramatsu, B. (2007). Tag, annotate, rate and share: Activities of daily living on the web. European Conference on Technology Enhanced Learning 2007, Crete, Greece. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)] †
91. McMartin, F. & Muramatsu, B. (2007). Use versus access: Design and use in educational digital libraries. Proceedings of the 7th ACM/IEEE-CS Joint Conference on Digital Libraries, Vancouver, BC. [Poster: [PDF](#)] †
92. Tront, J., Muramatsu, B. & Agogino, A. (2007). Selecting and evaluating digital learning materials for Engineering and Pre-Engineering Education. Workshop at the American Society for Engineering Education Annual Meeting 2007, Honolulu, HI.
93. Caswell, T., Muramatsu, B., and Henson, S. (2007). OpenCourseWare: It's not just MIT anymore. Poster presented at the New Media Consortium Summer Conference, Indianapolis, IN. [[PDF](#)]
94. Henson, S., Muramatsu, B. and Caswell, T. (2007). Web 2.0 for teaching and learning...folksemantic tool set. New Media Consortium Summer Conference, Indianapolis, IN.
95. Muramatsu, B. (2007, April). Tools for open content and open learning. Presentation at Learning Impact 2007, Vancouver, British Columbia, Canada. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]
96. Muramatsu, B. (2007, March). Services to link OpenCourseWare repositories and the NSDL. Presentation at the Pedagogic Services Partners Meeting, Carleton, MN. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]
97. Muramatsu, B. & Ball, J. (2007). Services to link OpenCourseWare repositories and the NSDL. Presentation at the Registries Experiment Partners Meeting, Seattle, WA. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]

2006

98. Muramatsu, B. (2006). OpenCourseWare and open content: Lessons for NSDL. Presentation in Panel Session "Open Content and...". 2006 NSDL Annual Meeting, Washington, DC. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]
99. Ainsworth, S., Honey, M., Johnson, W.L., Koedinger, K.R., Muramatsu, B., Pea, R.D., Recker, M., Weimar, S. (2006). [Cyberinfrastructure for Education and Learning for the Future: A Vision and Research Agenda](#). Computing Research Associates: Washington, D.C. [Local Copy: [PDF](#)] †

2005

100. McMartin, F., Jesuroga, S., Muramatsu, B. & McArthur, D. (2005). Sharing the lessons learned. Poster at the 2005 NSDL Annual Meeting, Denver, CO. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]
101. Muramatsu, B. (2005). Linking OpenCourseWare Repositories and the NSDL. Poster at 2005 NSDL Annual Meeting, Denver, CO. [Poster: [PDF](#)]

102. Tront, J.G., Muramatsu, B., McMartin, F. (2005). Selecting and evaluating digital learning materials for higher education. Presentation at the 2005 NSDL Annual Meeting, Denver, CO. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]
103. Teng X., Tront, J.G., Muramatsu, B., Agogino, A. (2005). Best practices in the design, development and use of courseware in engineering education. Proceedings of the 2005 Frontiers in Education Conference, October 19-22, Indianapolis, Indiana. †
104. Henson, S.L. & Muramatsu B. (2005, October). Starting an OpenCourseWare using eduCommons. Technical showcase at 2005 E-Learn World Conference, Vancouver, BC.
105. Henson, S.L. & Muramatsu, B. (2005, June). Is there an opencourseware project in your future? New Media Consortium Summer Conference, Honolulu, HI. [[PDE](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]
106. Muramatsu, B. & Dehlin, J. (2005). Open content for education. Presentation at the 2005 MERLOT International Conference. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]
107. Robson, R. and Muramatsu, B. (2005, September). Reusable Learning Workshop. Workshop at the OpenEd 2005, Logan, UT. [Workshop Materials: [ZIP](#)]

2004

108. Robson, R. and Muramatsu, B. (2004, November). Reusable Learning Workshop. Workshop at the eLearn 2004. [Workshop Materials: [ZIP](#)]
109. Robson, R., Muramatsu, B and Collier, J. (2004, November). Reusable Learning Workshop. [Workshop Materials: [ZIP](#)]
110. Muramatsu, B. & Dehlin, J. (2004). Open content for education. Presentation at the Instructional Technology Institute, Logan, UT. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]
111. Robson, R., Muramatsu, B and Collier, J. (2004, August). Reusable Learning Workshop. [Workshop Materials: [ZIP](#)]
112. Teng, X., Muramatsu, B., Zhang, J.W., Tront, J.G., McMartin, F. & Agogino, A.M. (2004) Implementation of quality evaluation for web-based courses and digital learning resources. Proceedings of the 3rd International Conference on Web-based Learning, Aug. 8-11, 2004, Tsinghua University, Beijing, China. [[PDF](#)] †
113. Tront, J.G., Muramatsu, B., McMartin, F., & Bayard, J.P. (2004). Selecting and Evaluating Digital Learning Materials for Higher Education. Proceedings of the 2004 Computers and Advanced Technology in Education, Kauai, HI. [Presentation: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) || Handouts: [PDF](#) || Abstract: [PDF](#), [DOCX](#), [DOC](#)]
114. Giersch, S., Klotz, E., McMartin, F., Muramatsu, B., Reinninger, K.A., Shumar, W. and Weimar, S.A. (2004). *If You Build It, Will They Come? Participant Involvement in Digital Libraries*. D-Lib Magazine. July 2004, Volume 10, Issue 7/8, ISSN 1082-9873 [[PDF](#), [DOCX](#), [DOC](#)] †
115. Muramatsu, B. and Wu, J. (2004). SMETE: Technology Provider for Exploratorium Online. Presentation at Exploratorium Online Meeting, San Francisco, CA. [[PowerPoint \(PPT\)](#), [PDF](#)]
116. Tront, J.G., Muramatsu, B., McMartin, F. (2004). Establishing a community to develop engineering courseware. Proceedings of the 2004 American Society for Engineering Education Annual Conference and Exposition. [[PDF](#), [DOCX](#), [DOC](#)] †
117. Muramatsu, B., Giersch, S., McMartin, F., Weimar, S. and Klotz, G. (2004). "If You Build It, Will They Come?" Lessons Learned from the Workshop on Participant Interaction In Digital Libraries. Poster Session at the 2004 ACM/IEEE Joint Conference on Digital Libraries, Tucson, AZ. [Poster: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) || Paper: [PDF](#)] †
118. Robson, R. and Muramatsu, B. (2004, June). How can reusable design guidelines improve the usefulness of educational digital libraries and collections? Workshop at the 2004 ACM/IEEE Joint Conference on Digital Libraries. [Workshop Materials: [ZIP](#)]

119. Robson, R., Muramatsu, B and Collier, J. (2004, May). Reusable Learning Workshop. [Workshop Materials: [ZIP](#)]
120. Tront, J.G., Muramatsu, B., McMartin, F. (2004). Establishing a community to develop engineering courseware contributors. Appears in Invention and Impact: Building excellence in undergraduate science, technology, engineering and mathematics (STEM) Education (A report from the NSF Course Curriculum and Laboratory Improvement April 2004 Conference). American Association for the Advancement of Science: Washington, DC.
121. Robson, R., Muramatsu, B and Collier, J. (2004, February). Reusable Learning Workshop. [Workshop Materials: [ZIP](#)]

2003

122. Muramatsu, B. (2003, December). MERLOT @ EDC. Presentation at the Education Development Center, Waltham, MA. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]
123. Muramatsu, B. (2003, November). NEEDS, SMETE.ORG and Educational Digital Libraries. Invited Presentation at the American Society for Information Science and Technology. Invited Presentation at the Digital Archives for Science and Engineering Resources Summit, MIT, Cambridge, MA, November 21-23, 2003. [[PowerPoint \(PPT\)](#), [PDF](#)] †
124. Tront, J. & Muramatsu, B. (2003, November). Selecting computer-enhanced learning for materials education. Workshop at Materials Research Society Fall Meeting, Boston, MA.
125. Muramatsu, B. (2003, October). The SMETE Digital Library at www.smete.org. Presentation at the eLearning Forum's eLearning Research & Programs at UC Berkeley, Berkeley, CA, October 23, 2003. [[PowerPoint \(PPT\)](#), [PDF](#)]
126. Tront, J. & Muramatsu, B. (2003b, July). Evaluating Quality in Computer-Enhanced Learning Materials in Engineering Education. Workshop at 2003 International Conference on Engineering Education, Valencia, Spain.
127. Tront, J. & Muramatsu, B. (2003a, July). Selecting and evaluating digital learning materials for higher education. Ed-Media 2003: World Conference on Educational Multimedia, Hypermedia and Telecommunications, Honolulu, HI. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#), [PDF with Notes](#)]
128. Tront, J.G., Muramatsu, B., McMartin, F., & Bayard, J.P., (2003b, July). Selecting and Evaluation Digital Learning Materials for Engineering Education. Workshop at Share the Future IV, Tempe, AZ.
129. Tront, J.G., Muramatsu, B., McMartin, F., & Bayard, J.P., (2003a, July). Selecting, and using computer-enhanced learning technologies and digital learning materials in engineering education. Workshop at the 2003 International Conference on Engineering Education, Valencia, Spain.
130. Tront, J.G., Muramatsu, B., & McMartin, F. (2003, July). Evaluating quality in computer-enhanced learning materials in engineering education. Proceedings of the 2003 International Conference on Engineering Education, Valencia, Spain.
131. Akli, L., Collins, C. T., Smith, J., Butler, R., Chang, A., George, Y., Gough, N., Lowy, M., Matyas, M., Muramatsu, B., Musante, S., & Taylor, J. (2003). Biosci Education Network (BEN) collaborative. In Proceedings of the 3rd ACM/IEEE-CS Joint Conference on Digital Libraries (Houston, Texas, May 27 – 31, 2003). International Conference on Digital Libraries. IEEE Computer Society, Washington, DC, 405-405. †
132. Hanley, G., McMartin, F., & Muramatsu, B. (2003). MERLOT: Multimedia Educational Resource for Learning and Online Teaching. Ed-Media 2003: World Conference on Educational Multimedia, Hypermedia and Telecommunications, Honolulu, HI.
133. Tront, J.G., & Muramatsu, B. (2003, April). Evaluating, selecting, and using computer-enhanced learning technologies and digital learning materials in engineering education. Invited workshop at the Materials Research Society 2003 Annual Meeting, San Francisco, CA.

2002

134. Muramatsu, B. (2002, November). Extending Scholarship to Including Teaching in a Digital World. Invited presentation at the SUNY Teaching, Learning, and Technology Meeting, Saratoga, NY, November 30, 2002. [[PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#)]
135. Muramatsu, B., Tront, J.G., & Bayard, J.P. (2002). Selecting E-Learning Materials for Adoption and Adaptation in STEM. Workshop at the 2002 MERLOT International Conference, Atlanta, GA.
136. Tront, J.G. & Muramatsu, B. (2002, October). Selecting and using digital learning materials in engineering education. Invited Workshop at Kettering University, Flint, MI.
137. Muramatsu, B. (moderator), Akli, L., Mason, B., Nair, S., & Ridgeway, J. (2002). Educational Digital Libraries for Science, Technology, Engineering and Mathematics. Panel at the 2002 MERLOT International Conference, Atlanta, GA. [[PowerPoint \(PPT\)](#), [PDF](#)]
138. Dong, A., Koning-Bastiaan, M. & Muramatsu, B. (2002). Implementing Federated Search Across Collections. 2002 MERLOT International Conference, Atlanta, GA. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
139. Muramatsu, B. & Tront, J.G. (2002, August). MERLOT and NEEDS: Educational Digital Libraries for Engineering Education. Presentation at the United Engineering Foundation Conference on E-Technologies in Engineering Education: Learning Outcomes Providing Future Possibilities, Davos, Switzerland. [Presentation: [PowerPoint \(PPT\)](#), [PDF](#) | | Premier Award: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)] †
140. Muramatsu, B. (2002, July). NEEDS, SMETE, MERLOT and the National STEM Education Digital Library Program. Presentation at the Council of Engineering and Scientific Society Executives, San Jose, CA, July 25, 2002. [[PowerPoint \(PPT\)](#), [PDF](#)] †
141. Tront, J.G. & Muramatsu, B. (2002, June). A community for developing high-quality technology-based courseware. Proceedings of the 2002 American Society for Engineering Education Annual Conference and Exposition, Montreal, CA. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) | | Paper: [PDF](#)] †
142. Muramatsu, B. and A. Dong, (2002). The SMETE Open Federation: Interoperability of Educational Digital Libraries. Proceedings of the 2002 ACM/IEEE Joint Conference on Digital Libraries, Portland, OR, July 14-18, 2002. [[PDF](#), [DOCX](#), [DOC](#)]
143. Tront, J. & Muramatsu, B. (2002). Adopting and adapting e-learning materials. Workshop at Share the Future III, Gainesville, FL.
144. Muramatsu, B. & Hanley, G.L. (2002, February). Digital Libraries: A Vehicle For Transforming Education in the Sciences, Mathematics, Engineering And Technology? Presentation at TechEd 2002 Conference, Long Beach, CA.
145. Muramatsu, B. (2002e, January). Personal Perspectives. Presentation at the Third Richard A. Harvill Conference on Higher Education: Developing a Sense of Place for Distance Education, Tucson, AZ. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
146. Muramatsu, B. (2002d, January). Collaborative Models for the Creation of Online Teaching Material. Invited Presentation at the Third Richard A. Harvill Conference on Higher Education: Developing a Sense of Place for Distance Education, Tucson, AZ. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
147. Muramatsu, B. (2002c, January). Educational Digital Libraries: The SMETE Open Federation. Invited Presentation at the Third Richard A. Harvill Conference on Higher Education: Developing a Sense of Place for Distance Education, Tucson, AZ. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
148. Muramatsu, B. (2002b, January). Premier Award for Excellence in Engineering Education Courseware For NEEDS—A Digital Library for Engineering Education. Invited Presentation at the Third Richard A. Harvill Conference on Higher Education: Developing a Sense of Place for Distance Education, Tucson, AZ. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
149. Muramatsu, B. (2002a, January). Creating online faculty collaboration to develop engineering education computer learning materials. Invited Presentation at the Third Richard A. Harvill Conference on Higher Education: Developing a Sense of Place for Distance Education, Tucson, AZ.

2001

150. Agogino, A., Dong, A., McMartin, F., & Muramatsu, B. (2001). The development of a national science, mathematics, engineering and technology education digital library. *Global digital library development in the new millennium: Fertile ground for distributed cross-disciplinary collaboration*, 1-12. †
151. McMartin, F., Bayard, J., Muramatsu, B., & Tront, J. (2001). Evaluating, selecting, and using computer enhanced learning technologies and courseware in engineering education. Workshop at Frontiers in Education Conference, Reno, NV.
152. Agogino, A. M., Dong, A., McMartin F., & Muramatsu, B. (2001). The development of a national science, mathematics, engineering and technology education digital library. Proceedings of the 12th International Conference on New Information Technology, Beijing, China. [[PDF](#)] †
153. Muramatsu, B. (2001, August). Selecting and adapting digital learning resources for science, mathematics, engineering and technology education. Invited Presentation at Virginia Tech. [Presentation: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) | | [PDF](#), [DOCX](#), [DOC](#)]
154. McMartin, F. & Muramatsu, B. (2001). Selecting and adapting learning technologies to improve engineering education. Proceedings of the 2001 International Conference on Engineering Education, Oslo, Norway. [Presentation: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) | | Paper: [PDF](#), [DOCX](#), [DOC](#)]
155. McMartin, F., & Muramatsu, B. (2001, June). What works and the challenges ahead in developing quality digital learning resources: A retrospective view of the Premier Award for Excellence in Engineering Education. Proceedings of the 2001 Conference of the American Society for Engineering Education, June 24-27, 2001, Albuquerque, New Mexico. [Presentation: [PDF](#), [PowerPoint](#), [PowerPoint \(PPT\)](#) | | Paper: [PDF](#), [DOCX](#), [DOC](#)]
156. Muramatsu, B. (moderator), Lightbourne, J., Manduca, C., Mardis, M., & Wiley, D. (2001, June). The national SMETE digital library. Panel at the ACM/IEEE Joint Conference on Digital Libraries, Roanoke, VA, June 25-28, 2001. [Presentation: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) | | Paper: [PDF](#), [DOCX](#), [DOC](#)] †
157. Muramatsu, B. (2001, April). Building the SMETE.ORG Alliance. Invited Presentation at the Strengthening the Public Information Infrastructure for Science Workshop. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
158. Muramatsu, B. (2001, April). Developing a national SMETE digital library At SMETE.ORG. Invited Presentation at the American Institute of Physics, Maryland. [Abstract: [PDF](#), [DOCX](#), [DOC](#)] [History of NSDL: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) | | SMETE.ORG Alliance: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]

2000

159. Muramatsu, B. and McMartin, F. (2000, November). SMETE.ORG training and information session. Workshop at the Project Kaleidoscope Faculty 21 Annual Meeting, Tucson, AZ, November 29, 2000.
160. Muramatsu, B., McMartin, F., & Agogino, A. (2000). Towards a digital learning community for engineering education. In 30th Annual Frontiers in Education Conference. Building on A Century of Progress in Engineering Education. Conference Proceedings (IEEE Cat. No. 00CH37135) (Vol. 2, pp. F3D-13). IEEE.
161. Muramatsu, B., McMartin, F., & Agogino, A. M. (2000, October). The development of a national science, mathematics, engineering and technology education digital library: Lessons learned from NEEDS. Proceedings of the 2000 Frontiers in Education Conference, October 2000, Kansas City, MO. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
162. McMartin, F., Bayard, J., Muramatsu, B., & Tront, J. (2000). Evaluating, selecting, and using computer enhanced learning technologies and courseware in engineering education. Workshop at Frontiers in Education Conference, Kansas City, MO.

163. Muramatsu, B. and McMartin, F. (2000a and 2000b, July). A national SMETE digital library. Presentations at the Project Kaleidoscope Summer Institute, Keystone, CO, July 19 and 26, 2000. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
164. Muramatsu, B. and McMartin, F. (2000). Building a National Science, Mathematics, Engineering and Technology Education Digital Library. Presentation at the Digital Library for Earth System Education. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
165. Muramatsu, B., (2000, June). Development of the national digital library for science, mathematics, engineering and technology education: Lessons learned from NEEDS. Proceedings of the 2000 American Society for Engineering Education Annual Conference: June 18-21, 2000, St. Louis, MO. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
166. Agogino, A. and Muramatsu, B. (2000). Towards a National SMETE Digital Library at www.smete.org. Presentation at Sun Microsystems. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
167. McMartin, F., Muramatsu, B., & Agogino, A. (2000). Criteria for selecting instructional software in engineering education. Proceedings of the 2000 American Society for Engineering Education Annual Conference: June 18-21, 2000, St. Louis, MO, Session 3430: June 21, 2000. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
168. Muramatsu, B. (2000, August). The development of a national science, mathematics, engineering and technology education digital library: Lessons learned from NEEDS. Proceedings of the 2000 International Conference on Engineering Education, August 13-17, 2000, Taipei, Taiwan. [Presentation: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) || Paper: [PDF](#), [DOCX](#), [DOC](#)] [Premier Award: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) || Paper: [PDF](#), [DOCX](#), [DOC](#)] [Action Agenda Update Slides: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)] †
169. Muramatsu, B. (2000, June). Learning technology standards. Tutorial at Ed-Media 2000, Montreal, Canada. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
170. Muramatsu, B. (2000, February). A digital learning space for science, mathematics, engineering, and technology education. Invited Speaker at the Mathematics/Science Education and Technology 2000 (M/SET), San Diego, CA. [Presentation: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) || Paper: [PDF](#), [DOCX](#), [DOC](#)] †
171. Muramatsu, B., Agogino, A.M., Klotz, E., McMartin, F., Robson, R., & Simutis, L. (2000, January). A national digital library for science, mathematics, engineering, and technology education. Presentation at the American Mathematics Society/Mathematical Association of America Joint Mathematics Meeting, Washington, DC. [Presentation: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) || Paper: [PDF](#), [DOCX](#), [DOC](#)]

1999

172. Muramatsu, B., McMartin, F. & Agogino, A.M. (Presented by Kurt Gramoll). (1999, November). NEEDS—The National Engineering Education Delivery System. Workshop on Advanced Technologies for Engineering Education and Consortium Planning: NASA Langley Research Center, Hampton, VA, November 3, 1999. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
173. Muramatsu, B., McMartin, F., Agogino, A. (1999). Innovative uses of engineering courseware available through NEEDS—The National Engineering Education Delivery System. In Proceedings of the 1999 Frontiers in Education Conference, San Juan, Puerto Rico. [Presentation: [PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#) || Paper: [PDF](#), [DOCX](#), [DOC](#)] †
174. Agogino, A.M., McMartin, F., & Muramatsu, B. (1999). SMETE information portal: A digital library for science, mathematics, engineering and technology education. Presented at NSF DLI-2 All Projects Meeting, Cornell University, Ithaca, NY. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
175. Muramatsu, B., McMartin, F., & Agogino, A.M. (1999, October). Developing a digital national library for science, mathematics, engineering and technology education: Building upon NEEDS — The

National Engineering Education Delivery System. Poster Session at Webnet: World Conference on WWW and the Internet, Honolulu, HI. [[PDF](#), [DOCX](#), [DOC](#)] †

176. Muramatsu, B. (1999, October). SMETE information portal: A digital library for science, engineering and technology education. Webnet: World Conference on WWW and the Internet, Honolulu, HI, Pre-conference Mini Course: Using Metadata to Facilitate Educational Resource Discovery and Reuse.
177. Muramatsu, B. & Agogino, A. (1999). NEEDS—The National Engineering Education Delivery System: A digital library for engineering education. D-Lib Magazine. April 1999, Volume 5, Issue 4, ISSN 1082-9873. [Local Copy: [HTML](#)] †
178. Muramatsu, B. (1999). NEEDS—The National Engineering Education Delivery System. SUCCEED Coalition-Effective Teaching with Technology Workshop: Clemson, SC, February 19, 1999. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]

1998

179. Eibeck, P. A. and Muramatsu, B. (1998). Premier courseware user group session seminar at the 1998 Frontiers in Education Conference, Tempe, AZ, November 5-7, 1998.
180. Agogino, A.M. and Muramatsu, B. (1998, July). Information Technologies Enabling New Modes of Learning. 5th Annual ABCM Undergraduate Faculty Enhancement Workshop, Berkeley, CA, July 14, 1998.
181. Muramatsu, B. (1998). NEEDS — The National Engineering Education Delivery System: Today and in the future. Presentation at the NSF Engineering Education Coalitions Directors Meeting, November, 1998. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
182. Agogino, A. M. & Muramatsu, B. (1998). The National Engineering Education Delivery System (NEEDS): A multimedia digital library of courseware. International Journal of Engineering Education, 13(5). [Local Copy: [PDF](#)] †
183. Muramatsu, B. (1998, June). Premier courseware user group panel session. 1998 American Society for Engineering Education Annual Conference: June 28-July 1, 1998, Seattle, WA, June 30, 1998. [[PowerPoint](#), [PowerPoint \(PPT\)](#), [PDF](#)]
184. Muramatsu, B. (1998). synthesis@berkeley. Invited Presentation to Mechanical Engineering 92-Introduction to Mechanical Engineering – Prof. David Bogy, Berkeley, CA, March 30, 1998.
185. Muramatsu, B. (1998, February). NEEDS—The National Engineering Education Delivery System. Proceedings of the 1998 Workshop on Advanced Technology for Engineering Education, NASA: Hampton, VA, February 24-25, 1998. †

1997

186. Muramatsu, B. (1997, October). Synthesis and the National Engineering Education Delivery System: Instructional technology is changing the way we teach and learn. Invited Lecture to Engineering 24 – History of Technology – Prof. James Casey, Berkeley, CA, October 21, 1997.
187. Muramatsu, B. (1997, August). The National Engineering Education Delivery System (NEEDS) supporting the transformation of engineering education. Proceedings of the 1997 International Conference on Engineering Education, August 15-17, 1997. [[PDE](#), [DOCX](#), [DOC](#)] †
188. Muramatsu, B. (1997, June). NEEDS—The National Engineering Education Delivery System: A database of engineering education courseware and multilevel peer review system. Invited Presentation to the Beta Coalition, Binghamton, NY, June 6, 1997.
189. Muramatsu, B. (1997, May). The Virtual Disk Drive Design Studio. Invited Presentation for Quantum, Milpitas, CA, May 2, 1997.
190. Agogino, A.M. & Muramatsu, B. (1997). Music and Mechanics: Instructional Technology on Display. Invited Presentation for the Alumni Associations of the University of California, Sacramento, CA, April 15, 1997.

191. Agogino, A.M., Muramatsu, B., Eibeck, P.A., & Stern, J. (1997). Effective Processes to Give Engineering Educators Easy Access To Quality Reviewed Electronic Courseware. National Science Foundation Engineering Education Innovators' Conference, Washington, D.C., April 7-8, 1997.
192. Agogino, A.M. & Muramatsu, B. (1997, March). Synthesis Coalition: Multimedia and the Internet Enabling New Modes of Learning. Invited Presentation at the All University Conference on Teaching and Learning, University of California at Los Angeles, Los Angeles, CA, March 25-26, 1997.
193. Muramatsu, B. & Stern, J. (1997b, March). Quality review of courseware and the NEEDS Database. Invited Presentation to Library and Information Systems 2xx – Prof. Howard Besser, Berkeley, CA, March 21, 1997.
194. Muramatsu, B. & Stern, J. (1997a, March). Quality review of courseware and the NEEDS Database. Invited Presentation to Engineering, Math, Science and Technology 291B – Prof. Marcia Linn, Berkeley, CA, March 18, 1997.
195. Agogino, A.M. & Muramatsu, B. (1997, January). A Multimedia Digital Library of Courseware. Invited Presentation at the 1997 Berkeley Multimedia Research Center Retreat: New Media Teaching and Learning Techniques, Berkeley, California, January 15-16, 1997.

1996

196. Eibeck, P.A., Muramatsu, B., Ramirez, M.R. (1996, November). The importance of quality in engineering courseware development. Proceedings of the IEEE/ASEE Frontiers in Engineering Education, Salt Lake City, UT, November 6-9, 1996.
197. Eibeck, P.A., Muramatsu, B., & Ramirez, M.R. (1996, September). Evaluation criteria for engineering instructional courseware. National Technological University (NTU) Engineering Faculty Forum Satellite Broadcast, September 8, 1996.
198. Agogino, A.M. and Muramatsu, B. (1996). The Synthesis Coalition: The National Engineering Education Delivery System (NEEDS): A Multimedia Digital Library of Courseware. American Society for Engineering Education International Conference, Washington, D.C., June 22-23, 1996. [[PDF](#)]
199. Muramatsu, B. (1996, March). Sharing quality courseware through NEEDS—The National Engineering Education Delivery System. Presentation at University of California at Berkeley, College of Engineering, Industrial Liaison Program, Berkeley, CA March 14, 1996.
200. Muramatsu, B. (1996, February). Sharing quality courseware through NEEDS—The National Engineering Education Delivery System. SUCCEED Coalition Third Annual Conference, Blacksburg, VA, February 29-March 2, 1996.
201. Agogino, A.M. and Muramatsu, B. (1996, January). NEEDS—A Multimedia Library of Engineering Courseware. Berkeley Multimedia Research Center Retreat, Berkeley, CA, January 11-12, 1996.

1995

202. Agogino, A. M., Muramatsu, B., Eibeck, P.A., Ramirez, M.R., & Oladipupo, B. (1995). Sharing Courseware Resources Through the NEEDS (National Engineering Education Delivery System) Database. Proceedings of the IEEE/ASEE Frontiers in Engineering Education, Atlanta, GA, November 1-4, 1995. [Local Copy: [HTML](#)]
203. Muramatsu, B. (1995). NEEDS—The National Engineering Education Delivery System. Invited Lecture in Interdisciplinary Studies 113 – Prof. Mary Kay Duggan, Berkeley, CA, October 18, 1995.
204. Muramatsu, B. (1995, September). Developing and distributing multimedia courseware: Personal experiences. American Society of Mechanical Engineering Design Theory and Methodology Conference, Boston, MA, September 18, 1995.
205. Agogino, A.M. & Muramatsu, B. (1995b, October). Multimedia Case Studies of Engineering Design. Invited Presentation for the Board of Regents of the University of California, San Francisco, CA, October 1995.

206. Agogino, A.M. & Muramatsu, B. (1995a, October). National Engineering Education Delivery System. National Technological University (NTU) Engineering Faculty Forum Satellite Broadcast, October 10, 1995.
207. Agogino, A.M. & Muramatsu, B. (1995, August). Mechatronics and Microelectronic Mechanical Systems. United States House of Representatives, Committee on Science Visit to the University of California at Berkeley, Berkeley, CA, August 9, 1995.

1994

208. Muramatsu, B. (1994). Vibrating Beam Experiment. American Society of Engineering Education, Pacific Southwest Section, September 1994.