包雷教授（Dr. Lei Bao）履历

职务及社会工作：
俄亥俄州立大学国际事务中心委员
美国国家物理教育协会国际委员会前任主任
IPERC 国际教育研究中心主任
REAL 教育研究与评估杂志主编
北京师范大学客座教授
北京交通大学客座教授
东南大学客座教授
华南师范大学客座教授
广西师范大学课程发展研究中心顾问

学历职称：
美国俄亥俄州立大学物理系、教育学院教授，博士生导师
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教育经历：
1999 年 获美国马里兰大学物理学博士学位
1992 年 获中国东南大学电子工程硕士学位
1990 年获中国东南大学电子工程学士学位

工作经历：
2011 年—2013 年: 美国俄亥俄州立大学物理系、教育学院教授
2007 年—2011 年: 美国俄亥俄州立大学物理系、教育学院副教授
2000 年—2006 年: 美国俄亥俄州立大学物理系助理教授
1999 年—2000 年：美国堪萨斯州立大学博士后
1994 年—1999 年：美国马里兰大学物理系助教

研究方向：
- 学生科学推理能力发展评估
- 科学推理能力教材、培训课程的开发
- 大规模教育测量与评估：多维评估分析模型，学习动态模型分析与测量（应用项目反应理论，因素分析，模型分析等多种方法）
- 中美科学教育比较研究
- 计算机辅助科学教学过程的评估与材料开发
- 课堂互动探究课程的评估与开发

正在进行的主要科研项目及项目资助：
1. 评估师范生科学推理能力, 美国国家自然科学基金(NSF)支持，$199,801, 2010~2013
2. 在科学课程中培养科学推理能力的理论与实践研究，美国国家健康研究基金(NIH)支持，$998,658, 2009~2013。
3. 师范生科学推理能力的培养与评估，美国国家自然科学基金支持，$125,000, 2009~2012。
4. 交叉学科科学教育数据平台，美国国家自然科学基金支持，$148,711, 2008~2011。

5. 眼球追踪及虚拟现实技术在计算机辅助物理教学中的应用，美国国家自然科学基金支持，$100,396, 2007~2011。
6. 大学物理课堂互动投票器的题库开发（单项选择概念测试系列题目），美国国家自然科学基金支持，$489,999，2006~2010,。

主要论文成果：

重要文章摘录如下， 包括 Science（美国科学杂志）论文：

1. Koenig, K., Schen, M., Edwards, M. & Bao, L., "Addressing STEM Retention through a Scientific Thought and Methods Course," Journal Of College Science Teaching, 41, no. 4, 23-29 (2012).
2. Aaron Adair and Lei Bao, "Project-Based Learning: Theory, Impact, and Effective Implementation," Research in Education Assessment and Learning, 3 (1), 6-21, (2012)
3. Li Chen, Jing Han, Jing Wang, Yan Tu, and Lei Bao, "Comparisons of Item Response Theory Algorithms on Force Concept Inventory," Research in Education Assessment and Learning, 2 (02), 26-34, (2011).
4. Shaona Zhou, Jing Han, Nathaniel Pelz, Xiaojun Wang, Liangyu Peng, Hua Xiao, Lei Bao, Inquiry Style Interactive Virtual Experiments: A Case on Circular Motion, European Journal of Physics, 32, 1597-1606, (2011).
5. Lin Ding, Neville Reay, Albert Lee, and Lei Bao, Exploring the role of conceptual scaffolding in solving synthesis problems, Phys. Rev. ST Physics Ed. Research 7, 020109 (2011).
6. Albert Lee, Lin Ding, N. W. Reay, and Lei Bao, "Single-Concept Clicker Question Sequences," Physics Teacher,49 (6) p385-389, (2011) .
7. Jing Wang and Lei Bao, "Analyzing Force Concept Inventory with Item Response Theory," Am. J. Phys., 78 (10), 1064-1070 (2010).
8. Lei Bao,* Tianfan Cai, Kathy Koenig, Kai Fang, Jing Han, Jing Wang, Qing Liu, Lin Ding, Lili Cui, Ying Luo, Yufeng Wang, Lieming Li, Nianle Wu, "Learning and Scientific Reasoning", ***Science***, Vol. 323. no. 5914, pp. 586 – 587 (2009).
9. Lei Bao, Kai Fang, Tianfang Cai, Jing Wang, Lijia Yang, Lili Cui, Jing Han, Lin Ding, and Ying Luo "Learning of Content Knowledge and Development of Scientific Reasoning Ability: A Cross Culture Comparison," Am. J. Phys., 77 (12), 1118-1123 (2009).
10. Lin Ding, Neville W. Reay, Albert Lee and Lei Bao, "Are we asking the right questions? Validating clicker question sequences through student interviews," Am. J. Phys., 77 (7), 643-650 (2009).
11. L. Bao, S. Stonebraker, and H. Sadaghiani, "A Flexible Homework System," Am. J. Phys., 76 (9), 878-881 (2008).
12. Lin Ding, Neville W. Reay, Albert Lee and Lei Bao, "The effects of testing conditions on conceptual survey results," Phys. Rev. ST Phys. Educ. Res. 4, 010112 (2008).
13. David E. Pritchard, Young-Jin Lee and Lei Bao, "Mathematical learning models that depend on prior knowledge and instructional strategies," Phys. Rev. ST Phys. Educ. Res. 4, 010109 (2008)
14. N.W. Reay, P. Li, and L. Bao, "Testing a New Voting Machine Methodology," Am. J. Phys. 76 (2) 171-178 (2008).
15. L. Bao and E. F. Redish, "Model Analysis: Assessing the Dynamics of Student Learning," Phys. Rev. ST Phys. Educ. Res. 2, 010103 (2006).
16. L. Bao, "Theoretical Comparison of Average Normalized Gain Calculations," Am. J. Phys. 74 (10) 917-922 (2006).
17. Gyoungho Lee, Jongho Shin, Jiyeon Park, Sangho Song, Yeonsoo Kim, Lei Bao, "An Integrated Theoretical Structure of Mental Models in Science Education: Students' ideas of the circular motion," J. Korea Assoc Res. Sci. Edu. 25-6, 698-709 (2005).
18. M. C. Wittmann, J. T. Morgan, and L. Bao, "Addressing student models of energy loss in quantum tunneling," Eur. J. Phys. 26 939-950 (2005). Chosen for "Highlights of 2005" by the journal.

19. N. W. Reay, L. Bao, P. Li, R. Warnakulasooriya and G. Baugh, “Toward an effective use of voting machines in physics lectures,” Am. J. Phys. 73, 554 (2005)
20. L. Bao and E. F. Redish, “Understanding probabilistic interpretations of physical systems: A pre-requisite to learning quantum physics”, Am. J. Phys. 70 (3), 210-217, (2002)
21. L. Bao, K. Hogg, and D. Zollman, “Model Analysis of Fine Structures of Student Models: An Example with Newton's Third Law,” Am. J. Phys. 70 (7), 766-778 (2002).
22. L. Bao and E. F. Redish, “Concentration Analysis: A Quantitative Assessment of Student States,” PERS of Am. J. Phys. 69 (7), S45-53, (2001).

媒体相关报道：

美国 40 于篇，中国 20 余篇

- 美国国家广播电台 NPR 于 2009 年 2 月对包教授进行专访，其间包教授“关于科学推理能力培养的若干看法”进行电台直播。
  http://www.sciencefriday.com/program/archives/200901305
- 英国 Nature Physics 杂志于 2009 年 11 月对包教授进行专访。
- 美国 Ohio Dispatch 报社于 2009 年 2 月对包教授进行专访。
- 美国 Science Daily 报社于 2009 年 2 月对包教授进行专访。
- China Daily 等知名报纸，新浪等网络媒体对包教授关于科学推理能力培养的相关研究进行转载报道。

受邀报告及论文：

受邀报告 60 余次；会议文章 20 余篇

附录：

论文成果链接：

Lei Bao,* Tianfan Cai, Kathy Koenig, Kai Fang, Jing Han, Jing Wang, Qing Liu, Lin Ding, Lili Cui, Ying Luo, Yufeng Wang, Lieming Li, Nianle Wu, “Learning and Scientific Reasoning”, ***Science***, Vol. 323. no. 5914, pp. 586 – 587 (2009).
Science http://www.sciencemag.org/cgi/content/short/323/5914/586

学术研究相关报道：

NPR：http://www.npr.org/templates/transcript/transcript.php?storyId=100056984
Science Daily：http://www.sciencedaily.com/releases/2009/01/090129140840.htm
China Daily：http://www.chinadaily.com.cn/china/2009-01/30/content_7432079.htm

受邀报告：

1. L. Bao, “Developing Effective Scientific Reasoning and Problem Solving Skills,” Colloquium, University of Cincinnati, Department of Physics and FUSION science education center.
2. L. Bao, “Developing and Assessing Student Ability: 21st Century Skills and 21st Century Education ,” Plenary Talk, China Physical Society, China-US Advanced Forum on Physics Education, August, 2012.
3. L. Bao, “Developing Effective Scientific Reasoning and Problem Solving Skills,” Strengthening Teaching and Learning in the STEM Fields, Harvard University (LASPAU), June, 2012.
4. L. Bao, “Learning, Reasoning, and Science Inquiry,” Colloquium, Harvard University, School of Engineering and Applied Sciences, Cambridge, MA, April, 2012.
5. L. Bao, “Jobs, Physics, and Education Reforms,” Invited Conference Speech, Annual Meeting of The Physical Society of Republic of China, January, 2012.

6. L. Bao, “STEM Education: US-China Comparison,” Plenary Talk, Advanced Workshop on Investigative Learning, Nanjing, China, August, 2011.
7. L. Bao, “Technology in Physics Education,” Hong Kong Institute of Education, Hong Kong, August, 2011.
8. L. Bao, “Scientific Reasoning and Science Education,” Plenary Talk, OCPA7 Biannual Meeting, Kaohsiung, Taiwan, August, 2011.
9. L. Bao, “STEM Learning and Scientific Reasoning,” NARST Annual Meeting, Orlando, FL, April, 2011.
10. L. Bao, “Assessment of Advanced Ability in Chinese College Admission Test,” AAPT Winter Meeting, Jacksonville FL, January, 2011.
11. L. Bao, “Science Learning and Scientific Reasoning,” Indiana University Purdue University Indianapolis, October, 2010.
12. L. Bao, “Advanced Methods in Education Assessment,” Beijing Education Testing Center, Beijing, September, 2010.
13. L. Bao, “Current Trends in Physics Education Research,” Beijing University of Posts and Telecommunications, Beijing, September, 2010.
14. L. Bao, “Introductory to Physics Education Research,” Beijing Institute of Technology, Beijing, September, 2010.
15. L. Bao, “Interactive Classrooms for Fostering Student General Abilities,” Central China Normal University, WuHan, September, 2010.
16. L. Bao, “Physics Education and Training of Scientific Reasoning,” South China Normal University, GuangZhou, August, 2010.
17. L. Bao, “Physics Education Research: A Research based Framework for Education Reform,” Hunan Normal University, ChangSha, August, 2010.
18. L. Bao, “Recent Development in Physics Education Research,” Plenary Speech, Annual Meeting of the Chinese National Association of Research in Higher Education of Physics, YunNan Normal University, KunMing, August, 2010.
19. L. Bao, “Developing Interactive Classroom Environments,” TongJi University, ShangHai, August, 2010.
20. L. Bao, “Assessment Methods and Instrument Design,” Beijing Normal University, Beijing, August, 2010.
21. L. Bao, “Physics Education Research Around the World,” 2010 International Physics and Science Education Research Forum, the Annual Meeting of Chinese Society of Education, Physics Education Committee, August, 2010.
22. L. Bao, “Current Trends in Physics Education Research: Methodology and Development,” Plenary Speech, Annual Meeting of the Education Committee of the Chinese Physical Society, Beijing, July, 2010.
23. L. Bao, J. Han, and K. Koenig, “Assessment of Scientific Reasoning: A Case in Proportional Reasoning,” AAPT-PERC, Portland, OR, July, 2010.
24. L. Bao, “Learning and Scientific Reasoning,” University at Buffalo (SUNY), July, 2010.
25. L. Bao, “Learning to Teach and Teaching to Learn,” APS/AAPT Winter Meeting, Washington DC, February, 2010.
26. L. Bao, “Learning and Scientific Reasoning” OSU Physics Colloquium, OSU, January, 2010.
27. L. Bao, “Establishing a Productive Global Collaboration,” OSU Research Symposium on Research and the Global University, OSU, November, 2009.
28. L. Bao, “Assessment of Learning and Reasoning,” AAPT Summer Meeting, Ann Arbor, July, 2009.
29. L. Bao, “Assessment and training in scientific reasoning,” IPERC Summer Workshop, Columbus, Ohio, July, 2009
30. L. Bao, “Connections between Science Content, Instruction, and Development of Scientific Reasoning: Developing a Research Based Framework for Sustainable Education Improvement,” Forum for School Science, AAAS Annual Meeting, Chicago, February, 2009.

31. L. Bao, “Physics Education Research Methods and Current Development,” China Eastern Normal University, ShangHai, November, 2008.
32. L. Bao, “Methods and Current Development in Science Education and Education Research,” Southeast University, Nanjing, November, 2008
33. L. Bao, “Physics Education Research: A Research Based Framework for Sustainable Education Improvement,” Higher Education Forum, TongJi University, ShangHai, November, 2008
34. L. Bao, “K-12 Science Education and Education Research,” BoYa Colloquium, HuaZhong Normal University, Wuhan, November, 2008.
35. L. Bao, “Physics Education Research,” Annual Meeting of the Education Committee of the Chinese Physical Society, Peking University, Beijing, November, 2008.
36. L. Bao, “Science Education and Education Research,” Forum on Physics Education and Teacher Training, Beijing Normal University, Beijing, November, 2008.
37. L. Bao, “Assessment of Learning: Review on Methodology,” IPERC Workshop, Beijing Jiaotong University, Beijing, November, 2008.
38. L. Bao, “Assessment of Scientific Reasoning,” Center for Research on College Science Teaching and Learning, Michigan State University, September, 2008.
39. L. Bao, “Cross Culture Comparison of Student Content Knowledge and Reasoning Ability,” AAPT Summer Meeting 2008.
40. L. Bao, “Student Learning/Reasoning Ability and Content Knowledge,” Wright State University, March 2008.
41. L. Bao, “Understanding Quantitative Assessment: Probability Frames and Methods,” University of Maryland, November, 2007.
42. L. Bao, Plenary Talk -- “Measurement and Cognitive Modeling,” Biennial Meeting for Foundations and Frontiers of Physics Education Research, Bar Harbor, Maine, 2007.
43. L. Bao, “Comparing the probabilistic frameworks of popular quantitative education measurement methods,” AAPT Summer Meeting 2007.
44. L. Bao, “Cognitive Modeling and Measurement in Education Research,” Center for Learning Science, Southeast University, Nanjing, China, July, 2007
45. L. Bao, “Research and Measurement Methodology in Physics Education,” GuangXi Normal University, Guilin, China, July, 2007
46. L. Bao, “Modeling Quantitative Assessment Data,” Tsinghua University, Beijing, China, June, 2007
47. L. Bao, “Physics Education Research and Quantitative Assessment,” BeiJing Normal University, Beijing, China, June, 2007
48. L. Bao, “Physics Education Research: An Interdisciplinary Field of Research,” BeiJing JiaoTong University, Beijing, China, June, 2007
49. L. Bao, “Model Analysis: Representing and Assessing the Dynamics of Student Learning,” APS April Meeting, Jacksonville Florida, April 15-17, 2007
50. L. Bao, “Theoretical Analysis of Models and Methods for Quantitative Assessment,” AAPT Summer Meeting 2006.
51. L. Bao, “Introduction to Model Analysis,” University of Toledo, Oct. 2005.
52. L. Bao, “Physics Education Research at The Ohio State University,” Tsinghua University, Beijing China, Aug. 2005.
53. L. Bao, “Research in Physics Education: An Overview,” Nanjing University, Nanjing China, Aug. 2005.
54. L. Bao, “Research and Development in Physics Education,” China-Japan-US Symposium on Physics Education and Experiment in University, Hangzhou China, Aug. 2005.
55. L. Bao, “Physics Principles in Modeling Education Assessment,” AAPT Summer Meeting, 2005
56. L. Bao, N. Reay, and L. Pengfei “Formative Use of In-Class Polling Technology in Physics Lectures,” AAPT Summer Meeting, 2005

57. L. Bao, “Theoretical and Experimental Approaches in Physics Education Research,” Invited Seminar, University of Washington, May 2005.
58. L. Bao, “Formative Use of In-class Polling Technology in Physics Lectures,” Invited Seminar, Rutgers University, April 2005.
59. L. Bao, “Model Analysis: a Framework for Cognitive Representation and Educational Assessment,” Physics Colloquium, North Carolina State University, Nov. 2004.
60. L. Bao, “Model Analysis as a Method for Cognitive Representation and Measurement,” AAPT *Announcer* 34 (2) 90 (Aug. 2004).
61. L. Bao, “Recent Advancement in Physics Education Research,” Symposium on Physics Research and Education, Nanjing, China, Aug. 2004.
62. L. Bao, “Formative Assessment: Theory, Methodology and Applications,” Fifth National Competition of Multi-Media and Internet Materials for Physics Education, ShiJiaZhuang, China, Aug. 2004. Keynote Speech.
63. L. Bao, “Internet and Virtual Reality Technology for Teaching Science,” Rainbow Education Research Institute, ShuZhou, China, Aug. 2004.
64. L. Bao, “Education Research in US,” Department of Education, ShengZheng BaoShang District, China, Aug. 2004.
65. L. Bao, “Computational Modeling of the Learning Process: A neural net simulation of students’ learning of charge distribution and polarization,” University of Maryland, Oct. 2003.
66. L. Bao, “Virtual Reality in the Teaching and Learning of Physics,” China Physics Society (CPS) Autumn Annual Meeting, HeFei, China, Sept. 2003.
67. L. Bao, “Recent Advancement in Physics Education Research: Theories and Experiments,” Physics Colloquium, SouthEast University, Nanjing, China, Aug. 2003.
68. L. Bao, “Current Research Issues and Advancement in Physics Education Research,” International Conference on Physics Education Research and Reform, JiAn, China, Aug. 2003. Keynote Speech.
69. L. Bao, “Model Analysis and Education Assessment,” AAPT *Announcer* 33 (2) 90 (Aug. 2003).
70. L. Bao, “Cognitive Representations: Philosophy and Design of Measurement,” AAPT *Announcer* 32 (2) 143 (Aug. 2002).
71. L. Bao, “States and Perturbations of Cognitive Processes in Learning Quantum Mechanics, ” Gordon Research Conferences, June, 2002, *Physics Research And Education: Quantum Mechanics*.
72. L. Bao, “Quantum Cognition: Are we ready?” AAPT National Conference, January, 2002, *Announcer* 31 (4) 67.
73. L. Bao, “Research on Physics Education,” International Conference on Physics Education Research and Reform, Hangzhou, China, April 1997.
74. L. Bao, “Physics of Flash Memory and Applications in Instruction of Quantum Mechanics”, University of Maryland, September 2000.
75. L. Bao, “Introduction to Model Analysis,” University of Washington, November 1999.
76. L. Bao, “Dynamics of Student Modeling and Assessment Method,” Rutgers University, October 1999.
77. L. Bao, “Model Analysis: A Quantitative Approach to Study Student Understandings of Physics,” Syracuse University, May 1999.

会议论文：

1. Liangyu peng, Lei Bao. Application of Matlab/Simulink and Orcad/PSpice Software in Theory of Circuits. 2010 International Conference on Broadcast Technology and Multimedia Communication (BTMC 2010), 2010 Second Pacific-Asia Conference on Knowledge Engineering and Software Engineering (KESE 2010). Chongqing, China, December 13-14, 2010. Volume III: 514-517. (IEEE publication)

2. Scott Zollinger, Patti Brosnan, Diana B. Erchick, and Lei Bao, "Mathematics Coaching: Impact on Student Proficiency Levels After One Year of Participation", North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA), (2010).
3. Lin Ding, Neville Reay, Albert Lee and Lei Bao, "Using Conceptual Scaffolding to Foster Effective Problem Solving" PERC proceedings (2009)
4. Homeyra R. Sadaghiani and Lei Bao, "Student Difficulties in Understanding Probability in Quantum Mechanics" PERC proceedings (Aug. 2005).
5. Yeounsoo Kim, Lei Bao and Omer Acar, "Students' Cognitive Conflict and Conceptual Change in a PBI Class," PERC proceedings (Aug. 2005).
6. Yeounsoo Kim and Lei Bao, "Development of an Instrument for Evaluating Anxiety Caused by Cognitive Conflict," PERC proceedings (Aug. 2004).
7. Gyoungho Lee, Jiyeon Park, Yeounsoo Kim and Lei Bao, "Alternative Conceptions, Memory & Mental Model in Physics Education," PERC proceedings (Aug. 2004).
8. Dedra Demaree, Stephen Stonebraker, Wenhui Zhao and Lei Bao, "Virtual Reality Experiments in Introductory Physics Laboratories," PERC proceedings (Aug. 2004).
9. Rasil Warnakulasooriya and Lei Bao, "Procedural Rules in Students' Reasoning," PERC proceedings July 2003.
10. Neville W. Reay, Lei Bao, Gordon Baugh and Rasil Warnakulasooriya, "Business-Style" Group Work in a Freshman Engineering Honors Class," PERC proceedings July 2003.
11. Florin Bocaneala and Lei Bao, "Neural Network Modeling for Physics Learning: A Case on E&M," PERC proceedings July 2003.
12. Homeyra Sadaghiani and Lei Bao, "Lecture Demonstrations in Modern Physics: Quality vs. Quantity," PERC proceedings July 2003.
13. Homeyra R. Sadaghiani and Lei Bao, "Immediate Informative Feedback Using a New Homework System," PERC proceedings Aug. 2002.
14. Keith Oliver and Lei Bao, "Student Resources in Quantum Mechanics, or Why Students Need Meta Resources," PERC proceedings Aug. 2002.
15. Gyoungho Lee and Lei Bao, "Context Map: A Method to Represent The Interactions Between Students' Learning and Multiple Context Factors," PERC proceedings Aug. 2002.
16. Rasil Warnakulasooriya and Lei Bao, "Toward a Model-Based Diagnostic Instrument in Electricity and Magnetism - An Example," PERC proceedings Aug. 2002.
17. Gyoungho Lee and L. Bao, "Graduate and undergraduate students' views on learning and teaching physics," PERC proceedings, July 2001.
18. R. Warnakulasooriya and L. Bao, "Students' understanding of Electricity and Magnetism for the development of a model based diagnostic test," PERC proceedings, July 2001.
19. Richard N. Steinberg., Michael. C. Wittmann, Lei Bao, and Edward F. Redish, "The Influence of Student Understanding of Classical Physics When Learning Quantum Mechanics," Research on the Teaching and Learning of Quantum Science, NARST Annual Meeting, Boston, March, 1999. Http://www.phys.ksu.edu/perg/paper/narst/.
20. Zhonghan Woo, Lei Bao, Wang Ling and Yuan Chunwei, "AFM Analysis on the Bioelectric Property of Fish Scale Plates," The Eighth Symposium on Electrets, Paris, Sept., 1994.
21. Zhonghan Woo, Lei Bao, et al, "Electrostatic Technology and Clean Engineering," International Conference on Air and Water Cleaning Technology, China, June, 1993.
22. Lei Bao, Yiming Ling, "Ozone Synthesis with UV and Silent Discharge," The Asia-Pacific Conference on Plasmas Science and Technology, China, Sept. 1992.