Curriculum Vitae

Haisheng Li

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Education

- Ph.D. in Mathematics, Rutgers University, 1994.
- M.S. in Mathematics, Harbin Normal University, 1986.

Employment

- Rutgers University, Camden (July 2006–present), Professor.
- Rutgers University, Camden (July 2001–June 2006), Associate Professor.
- Rutgers University, Camden (July 1996–June 2001), Assistant Professor.
- University of California, Santa Cruz (July 1994–June 1996), Visiting Assistant Prof.

Research interests

- Infinite-dimensional Lie algebras, vertex operator algebras and algebraic conformal field theory

Awards and Grants

- NSF Grants 2006-2008; 1996-2002.
- NSA Grants 2002-2006.
- Rutgers Research Council Grants, 2000-2003.
- Fellowship, Institute for Advanced Study, Jan. 1997-July 1997.
- NSF Postdoctoral fellowship, 1996, declined because of an administrative reason.

Publication

Book: *Introduction to Vertex Operator Algebras and Their Representations*, Progress in Math. **227**, Birkhäuser, Boston, 2004, 318 pages (with James Lepowsky).

Articles:

1. On vertex algebras and their modules associated with even lattices, submitted for publication; arXiv:0802.0173, with Qing Wang.
2. Some quantum vertex algebras of Zamolodchikov-Faddeev type, submitted for publication; arXiv:0801.2901, with Martin Karel.
3. Modules-at-infinity for quantum vertex algebras, accepted for publication in *Commun. Math. Phys.* (2008); arXiv:0705.0687.

4. Twisted modules and quasi-modules for vertex operator algebras, in the Proceedings of the International Conference in honor of Professors James Lepowsky and Robert Wilson, Contemporary Math. **422** (2007), 389-400.

5. A smash product construction of nonlocal vertex algebras, *Commun. Contemporary Math.* **9** (2007) 605-637.

6. A recurrence relation for characters of highest weight integrable modules for affine Lie algebras, *Commun. Contemporary Math.* **9** (2007) 121-133, with William Cook and Kailash Misra.

7. Twisted modules for vertex algebras associated with vertex algebroids, *Pacific Journal of Mathematics* **229** (2007) 199-222, with G. Yamskulna.

8. On certain generalizations of twisted affine Lie algebras and quasimodules for Γ-vertex algebras, *J. Pure Appl. Algebra* **209** (2006), 853-871.

9. Constructing quantum vertex algebras, *International Journal of Mathematics* **17** (2006), 441-476.

10. On the concepts of intertwining operator and tensor product module in vertex operator algebra theory, *J. Pure Appl. Alg.* **204** (2006), 507-535, with Y. Huang, J. Lepowsky and L. Zhang.

11. A new construction of vertex algebras and quasi modules for vertex algebras, *Adv. Math.* **202** (2006), 232-286.

12. Nonlocal vertex algebras generated by formal vertex operators, *Selecta Mathematica (N.S.)* **11** (2005), 349-397.

13. Abelianizing vertex algebras, *Commun. Math. Phys.* **259** (2005), 391-411.

14. Pseudoderivations, pseudoautomorphisms and simple current modules for vertex operator algebras, in Proceedings of the International Conference on "Infinite Dimensional Aspects of Representation Theory and Applications," University of Virginia, Charlottesville, May 18-22, 2004, Contemporary Math **392** (2005), 55-65.

15. On certain vertex algebras and their modules associated with vertex algebroids, *J. Alg.* **283** (2005), 367-398, with G. Yamskulna.

16. Fusion rules for vertex operator algebra V_L^+, *Commun. Math. Phys.* **253** (2005), 171-219, with T. Abe and C. Dong.

17. On certain categories of modules for affine Lie algebras, *Math. Z.* **248** (2004), 635-664.

18. Vertex algebras and vertex Poisson algebras, *Commun. Contemporary Math.* **6** (2004), 61-110.

19. Simple vertex operator algebras are nondegenerate, *J. Alg.* **267** (2003), 199-211.

20. Axiomatic G_1-vertex algebras, *Commun. Contemporary Math.* **5** (2003), 1-47.

21. A higher dimensional generalization of the notion of vertex algebras, *J. Alg.* **262** (2003), 1-41.

22. Vertex (operator) algebras are "algebras" of vertex operators, *Fields Institute Communications* **39** (2003), 111-122.

23. Regular representations and Huang-Lepowsky's tensor functors for vertex operator algebras, *J. Alg.* **255** (2002), 422-462.

24. Regular representations of vertex operator algebras, *Commun. Contemporary Math.* **4** (2002), 639-683.

25. Vertex Lie algebra, Poisson algebras and vertex operator algebras, in: *Recent Developments in Infinite-Dimensional Lie Algebras and Conformal Field Theory, Proc. of an International Conference, May 23-27, 2000, University of Virginia,* ed. by S. Berman, P. Fendley, Y.-Z. Huang, K. Misra and B. Parshall, Contemporary Math. **297**, Amer. Math. Soc., 2002, 69-96, with C. Dong and G. Mason).

26. The regular representations and the $A_n(V)$-algebras, in: CRM Proceedings and Lecture Notes, Volume 30 (2001), 99-116.

27. Regular representations, Zhu's $A(V)$-theory and induced modules, *J. Alg.* **238** (2001), 159-193.

28. Generalized vertex algebras generated by parafermion-like operators, *J. Alg.* **240** (2001), 771-807, with Y. Gao.

29. Certain extensions of vertex operator algebras of affine type, *Commun. Math. Phys.* **217** (2001), 653-696.

30. On abelian coset generalized vertex algebras, *Commun. Contemp. Math.* **3** (2001), 287-340.

31. Modular invariance of trace functions in orbifold theory and generalized moonshine, *Commun. Math. Phys.* **214** (2000), 1-56, with C. Dong and G. Mason.

32. On genus-zero correlation functions of vertex operator algebras, in: Proceedings of the International Conference on Representation Theory, July 1998, Shanghai, China, 295-313.

33. On **Z**-graded algebras and their **N**-graded modules, in: Proc. Representations of Affine and Quantum Affine Algebras and Their Applications, North Carolina State University, 1998, Contemporary Mathematics, Vol. 248, Amer. Math. Soc., 1999, 341-357, with S. Wang.

34. Determining fusion rules by $A(V)$-modules and bimodules, *J. Alg.* **212** (1999), 515-556.

35. Some finiteness properties of regular vertex operator algebras, *J. Alg.* **212** (1999), 495-514.

36. Certain generating subspaces of vertex operator algebras, *J. Alg.* **217** (1999), 393-421, with M. Karel.

37. Twisted representations of vertex operator algebras and associative algebras, *International Mathematical Research Notices* **8** (1998), 389-397, with C. Dong and G. Mason.

38. Vertex operator algebras and associative algebras, *J. Alg.* **206** (1998), 67-96, with C. Dong and G. Mason.

39. The radical of a vertex operator algebra, in *The Monster and Lie Algebras*, Mathematical Research Institute Publications 7, Ohio State University, Edited by J. Ferrar and K. Harada, 17-25, with C. Dong, G. Mason and P. Montague.

40. Associative subalgebras of the Griess algebra and related topics, in *The Monster and Lie Algebras*, Mathematical Research Institute Publications 7, Ohio State University, Edited by J. Ferrar and K. Harada, 27-42, with C. Dong, G. Mason and S. Norton.

41. Twisted representations of vertex operator algebras, *Math. Ann.* **310** (1998), 571-600, with C. Dong and G. Mason.

42. An analogue of the Hom-functor and a generalized nuclear democracy theorem, *Duke Math. J.* **93** (1998), 73-114.

43. Vertex operator algebras and modules associated to admissible representations of $\hat{sl}_2$, *Commun. Math. Phys.* **184** (1997), 65-93, with C. Dong and G. Mason.

44. Certain associative algebras similar to $U(sl_2)$ and Zhu's algebra $A(V_L)$, *J. Alg.* **196** (1997), 532-551, with C. Dong and G. Mason.

45. Regularity of rational vertex operator algebras, *Adv. Math.* **132** (1997), 148-166, wWith C. Dong and G. Mason.

46. The physics superselection principle in vertex operator algebra theory, *J. Alg.* **196** (1997), 436-457.

47. Extension of vertex operator algebras by a simple module, *J. Alg.* **187** (1997), 236-267.

48. Compact automorphism groups of vertex operator algebras, *International Mathematical Research Notices* **18** (1996), 913-921, with C. Dong and G. Mason.

49. Simple currents and extensions of vertex operator algebras, *Commun. Math. Phys.* **180** (1996), 671-707, with C. Dong and G. Mason.

50. Some twisted sectors for the moonshine module, *Contemporary Math.* **193** (1996), 25-43, with C. Dong and G. Mason.

51. Introduction to vertex operator algebra II, *Moonshine and vertex operator algebra,* Lecture Notes **904**, Research Institute for Mathematical Sciences, Kyoto University, 1995, 26-50.

52. Local systems of twisted vertex operators, vertex superalgebras and twisted modules, *Contemporary Math.* **193** (1996), 203-236.

53. Local systems of vertex operators, vertex superalgebras and modules, *J. Pure Appl. Alg.* **109** (1996) 143-195.

54. A characterization of vertex algebras associated to even lattices, *J. Alg.* **173** (1995), 253-270, with X. Xu.

55. Symmetric invariant bilinear forms on vertex operator algebras, *J. Pure Appl. Alg.* **96** (1994), 279-297.

Invited Talks in Domestic and International Conferences

1. Invited speaker in "the Tenth Chinese National Lie Algebra Conference," Changshu, China, Aug. 9-15, 2007.

2. Invited speaker in the international conference and workshop on Infinite-Dimensional Lie Algebras and Vertex Operator Algebras, The Chern Institute of Mathematics, Nankai University, China, May 29-June 9, 2006.

3. Invited speaker in "the Ninth Chinese National Lie Algebra Conference," Harbin Normal University, Harbin, China, July 11-15, 2005.

4. Invited speaker in "Lie Algebras, Vertex Operator Algebras and Their Applications," North Carolina State University, Raleigh, May 17-21, 2005.

5. Invited speaker in Algebra Seminar, North Carolina State University, Raleigh, March 18, 2005.

6. Invited speaker in Mathematical Physics Seminar, Pennsylvinia State University, March 25, 2005.

7. Invited speaker in "International conference on perspectives arising from vertex algebras," Osaka, Japan, Nov. 7-12, 2004.

8. Invited speaker in "International Conference on Representation Theory III (ICRT III)," Sichuan University, Chengdu, China, July 30-Aug. 4, 2004.

9. Invited speaker in "International Conference on Infinite Dimensional Lie Theory," Morningside Mathematical Center, Chinese Academy of Sciences, Beijing, China, July 18-23, 2004.

10. Invited speaker in "Moonshine - the First Quarter Century and Beyond. A Workshop on the Moonshine Conjectures and Vertex Algebras," Heriot-Watt University, Edinburgh, July 5-13, 2004,

11. Invited speaker in "International Conference on Tensor Categories in Mathematics and Physics," The Erwin Schrodinger International Institute for Mathematical Physics, Vienna, Austria, June 20-July 2, 2004.

12. Invited speaker in the conference "Infinite Dimensional Aspects of Representation Theory and Applications," University of Virginia, Charlottesville, May 18-22, 2004.

13. Invited speaker in the Lie Theory Workshop of University of California, Santa Cruz, April 24-25, 2004.

14. Invited speaker in the workshop "Conformal Field Theory and Vertex Algebras," Osaka, Japan, Jan. 10-12, 2004.

15. Invited speaker in the Eighth Chinese National Lie Algebra Conference, Xiamen, China, July 29-Aug 4, 2003.

16. Invited speaker in the conference "infinite Dimensional Lie Theory and Its Applications," Fields Institute, Toronto, Canada, July 21-25, 2003.

17. Invited speaker in 2002 Canadian Mathematical Society Winter Meeting, Ottawa, Dec. 8-Dec. 10, 2002.

18. Invited speaker in the Algebra Seminar, North Carolina State University, Raleigh, Nov. 8, 2002.

19. Invited speaker in the Group Theory and Lie Theory Seminar, University of Michigan, Nov. 4, 2002.

20. Invited speaker in the Deformation Seminar, University of Pennsylvania, Oct. 23, 2002.

21. Invited speaker in the workshop on "Vertex Operator Algebras in Mathematics and Physics," Morningside Mathematical Center, Chinese Academy of Sciences, Beijing, China June 17-23, 2001.

22. Invited speaker in 2001 Canadian Mathematical Society Summer Meeting, Saskatoon, May, 2001.

23. Invited speaker in the workshop on "Vertex operator algebras," Fields Institute, Toronto, Canada, Oct. 23- 27, 2000.

24. Invited speaker in "Algebraic Combinatorics, Monster and Vertex Operator Algebras," University of California, Santa Cruz, July 24-28, 2000.

25. Invited speaker in the 7th Chinese National Conference on Algebra, Beijing, China, Oct. 10-14, 1999.

26. Invited speaker in the conference on "Modular forms, Mirror Symmetry and Vertex Operator Algebras," University of Montreal, Canada, May 28-June 4, 1999.

27. Invited speaker in Shanghai international conference on representation theory, East China Normal University, Shanghai, China, June 28-July 4.

28. Invited speaker in the conference "Vertex operator algebras and quantum groups," North Carolina State University, Raleigh, May 20-26, 1998.

29. Invited speaker in the American Mathematical Society meeting, Wayne State University, Detroit, Michigan, May 2-3, 1997.

30. Invited speaker in the workshop "Elliptic cohomology and vertex operator algebra," University of Glasgow, Glasgow, Scotland, Jan. 25- Feb. 2, 1997.

31. Invited speaker in the conference "The Monster and Lie algebras," Ohio State University, Columbus, May, 1996.

32. Invited speaker in the UC Spring Workshop "Lie Groups, Lie algebras and their Representations," Santa Cruz, April 8-9, 1995.

33. Invited speaker in the conference "Vertex operator algebras and Moonshine," The Mathematical Science Research Institute, Kyoto University, Japan, Sept. 5-9, 1994.

34. Invited speaker in American Mathematical Society Summer Research Conference "The Monster, Moonshine and Related topics," Mount Holyoke College, South Hadley, MA, June 19-24, 1994.

35. Invited speaker in the American Mathematical Society meeting, Kansas State University, Manhattan, Kansas, March 25-26, 1994.