RONGWEI YANG

CONTACT

Department of Mathematics and Statistics
University at Albany
the State University of New York
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EDUCATION

SUNY at Stony Brook, Long Island, NY 11794
Degree awarded: **Ph.D. in Mathematics**, Date: **May, 1998**
Dissertation Title: **Hardy Modules**, Advisor: **Ronald G. Douglas**

Fudan University, Shanghai, China
Degree Program: **M.S. in Mathematics**
Thesis Title: **Two-variable Harmonic Bergman Space**

Shanghai University of Science and Technology, Shanghai, China
Degree Awarded: **B.S. in Mathematics**, Date: **July, 1991**
Thesis Title: **A Mathematical Model of Dental Arc**

PROFESSIONAL EXPERIENCES

SUNY at Albany, Albany, NY 12222 (09/2014 - present), Professor
Texas A&M University (08/2015 -12/2015), Visiting Professor
Vanderbilt University (01/2009 - 05/2009), Visiting Associate Professor
SUNY at Albany, Albany, NY 12222 (09/2007 - 08/2014), Associate Professor
SUNY at Albany, Albany, NY 12222 (09/2002 - 07/2007), Assistant Professor
Arizona State University, Tempe, AZ 85287 (08/2001 - 08/2002), Visiting Assistant Professor
University of Georgia, Athens, GA 30602 (09/1998 - 07/2001), Post-doctoral Associate

RESEARCH INTERESTS

Functional Analysis, Representation Theory, Lie Algebras, Math Physics

FUNDING

- *A spectral theory of non-commuting operators*, Simons Foundation, MP-TSM-00002315, 9/2023 - 8/2028.

- *Analysis on Hardy and Bergman Modules* (joint with K. Zhu), N.S.F. Regular Award, DMS 0500333, 6/2005 - 6/2008.
- *Operator Theory in the Hardy Space Over the Bidisk* (joint with D. N. Clark), N.S.F. Regular Award, DMS 9970932, DMS 0139774, 6/1999 - 6/2002.

RESEARCH ADVISEES

- **Seth Hulbert**, Ph.D, in progress.
- **Alessandro Chilelli**, Ph.D, in progress.
- **Kate Howell**, Ph.D, in progress.
- **Michael Muller**, Ph.D., June 2023.
- **Sachin Munshi**, Ph.D., April 2020.
- **Mai Tran**, Ph.D., Sept. 2019, Assis. Professor, West Point Military Academy, USA
- **Bryan Goldberg**, Ph.D., April, 2019.
- **Yixin Yang**, Ph.D, May 2015, Professor, Dalian University of Technology, China.
- **Yue Wu**, Ph.D, May 2015, Assistant Professor, the Central University of Finance, China.
- **Yueshi Qin**, Ph.D, May 2014, Associate Professor, Chong Qin University, China.
- **Pat Cade**, Ph.D, May 2012 (**CAS Distinguished Doctoral Dissertation Award**).
- **Mariah St. Onge**, B.S., April 2023 to present
- **Mikaela Jordan**, B.S., May 2014, (**SUNY STEM Undergraduate Research Fellowship Award**).
- **Adam Nease**, B.S., Summer 2014 to Summer 2015.
- **Yufeng Li** B.S., Fall 2013 to Spring 2014, (**Presidential Award for Undergraduate Research**).
- **Konstantin Stulov**, B.S., graduated in May 2012, (**UAlbany Adrienne Zimberg 83 Endowment Award**), Thesis: An elementary inequality about Mahler measure.
- **Amalia Jerison**, M.S., May 2006, Thesis: Jordan Block operators in $H^2(D^2)$.

INVITED PRESENTATIONS

- Aug. 2023, *Group representations and Julia sets*, International Conference on Noncommutative Geometry (in honor of Guoliang Yu's 60th birthday), Qinhuangdao, China.
- Aug. 2023, *The characteristic polynomial of Lie algebras*, Colloquium, Tianjin Normal University, China.
- Jul. 2023, *Self-similarity and complex dynamics*, Analysis Seminar, Shandong University, China.
- Jul. 2023, *Ten lectures in Mathematics–history, thoughts, and philosophy*, summer course Dalian University of Technology, China.
- July 2023, *Group representations and Julia sets*, Analysis Seminar, Fudan University, China.
- May 2023, *Self-similarity and complex dynamics*, Banff International Research Station workshop, Banff, Canada.
- Apr. 2023, *The characteristic polynomial of Lie algebras*, Analysis Seminar, Williams College, NY.

- Feb. 2023, *Self-similarity and complex dynamics*, Analysis Seminar, Binghamton University, NY.
- Jan. 2023, *The characteristic polynomial of several matrices*, Analysis Seminar, Guangzhou University, China.
- Nov. 2022, *Non-Euclidean geometry and reality*, University In High School Conference, Albany, NY.
- Sept. 2022, *Maxwell's equations and Yang-Mill's equations in complex variables*, Northeast Analysis Network, Albany, NY.
- Jul. 2022, *Maxwell's equations and Yang-Mill's equations in complex variables*, the 9th Intl. Conf. Differential and Functional Differential Eqs., Moscow, Russia.
- Spring, 2022, *Some aspects of projective spectrum*, seminar series, Shandong University & Dalian University of Technology.
- Aug. 2021, *Characteristic Polynomial, Compact Operator and Projective Spectrum*, IWOTA 2021, Lancaster, UK.
- Jun. 2021, *Characteristic Polynomial, Compact Operator and Projective Spectrum*, WOTCA 2021, Lisboa, Portugal.
- Aug. 2020, *Projective spectrum, self-similarity and complex dynmics*, Fudan Univesity, China.
- Feb. 2020, *Projective spectrum and spectral dynamics*, Stony Brook University, USA.
- Dec. 2019, *A two variable view of the invariant subspace problem*, Tsinghua Sanya Intl. Math. Forum, China.
- Oct. 2019, *Noneuclidean metrics on resolvent set*, University at Delaware, USA.
- Jul. 2019, *Projective spectrum in Banach algebras*, Insti. Math., Chinese Academy of Sci., China.
- Apr. 2019, *Some aspects of projective spectrum*, Multiparameter spectral theory and representation theory workshop, Banff Intl. Res. Station, Canada.
- Jan. 2019, *Projective spectrum, group theory and complex dynamics*, Insti. Math., Chinese Academy of Sci., China.
- Jan. 2019, *Projective spectrum, group theory and complex dynamics*, Tsinghua Univ., China.
- Dec. 2018, *Projective spectrum(I, II, III, IV)*, Northeastern Normal Univ. and Jilin Univ., China.
- Dec. 2018, *Projective spectrum, group theory and complex dynamics (I, II, III)*, Indian Insti. Sci, Bangalore, India.
- Dec. 2018, *Projective spectrum, group theory and complex geometry*, Recent Advances in Operator Theory and Operator Algebras, Bangalore, India.
- Oct. 2018, *Projective spectrum, group theory and complex geometry*, Northeastern Analysis Network, Albany, New York.
- Jul. 2018, *Projective spectrum and finitely generated groups*, International Workshop on Oper. Theory and Appl., Shanghai, China.
- Jul. 2018, *Some aspects of projective spectrum*, Workshop on group theory and funtional analysis, Tianjin Normal Univ., China
- Oct. 2017, *Quasinilpotent operator and non-Euclidean metrics*, the 9th Operator Theory and Operator Algebra Conference, Dalian, China.
- Jun 2017, *Joint spectrum and infinite dihedral group*, Chongqin Analysis Meeting, Chongqin, China.

- Jun. 2016, *Joint spectrum and infinite dihedral group*, Workshop on Oper. Theory and Comp. Anal., Coimbra, Portugal.
- Jun. 2016, *Projective spectrum in Banach algebras*, Dalian Univ. of Technology, Dalian, China.
- Jun. 2016, *Projective spectrum in Banach algebras*, International conf. on toplogy and funct. anal., Tongliao, China.
- Nov. 2015, *Projective spectrum in Banach algebras*, Colloquium, Baylor University, TX, USA.
- Jun. 2015, *Projective spectrum in Banach algebras*, Guangzhou University, China.
- Jun. 2015, *Invariant subspaces in the Hardy space over the bidisk*, AMS-EMS-SPM joint meeting, Porto, Portugal.
- Dec. 2014, *Projective spectrum in Banach algebras*, Colloquium, IUPUI, Indinapolis. USA.
- Jul. 2014, *Invariant subspaces in the Hardy space over the bidisk*, Small Workshop in Operator Theory, Krakow, Poland.
- Apr. 2014, *Projective spectrum in Banach algebras*, Hilbert Modules and Complex Geometry, Mathematisches Forschungsinstitut Oberwolfach, Germany.
- Jan. 2014, *Numerical invariants of commuting isometric pairs*, American Mathematical Society Annual Meeting, Baltimore, MD, USA.
- July 2013, *Projective spectrum in Banach algebras*, Non-commutative Geometry and Multivariable Operator Theory, Fudan University, China.
- June 2013, *Nagy-Foias theory in the Hardy space over the bidisk*, Nagy's centennial conference, Bolya Institute, Hungary.
- Sep. 2012, *A Beurling-Lax-Halmos theorem in the Hardy space over the bidisk*, American Mathematical Society Sectional Meeting, Rochester, NY, USA.
- Sep. 2011, *A new joint spectrum and cyclic cohomology*, American Mathematical Society Sectional Meeting, Ithaca, NY, USA
- Apr. 2011, *Banach algebra and hyperplane arrangements*, American Mathematical Society Sectional Meeting, Worchester, MA, USA.
- Aug. 2010, *Operator Model Theory revisited*, Multivariable Operator Theory Conference, Banff International Research Station, Canada.
- Mar. 2010, *Invariant subspaces in the Hardy space over the bidisk*, Recent Adv. in Function-Related Operator Theory, Rincon, Peurto Rico.
- Mar. 2010, *Projective spectrum in Banach algebras*, Colloquium, University of Peurto Rico, USA.
- June 2009, *Projective spectrum in Banach algebras*, Conference in honor of Daoxin Xia's 80th Birthday, Suzhou, China.
- Apr. 2009, *Projective spectrum in Banach algebras*, Multivariable Operator Theory Workshop, Oberwolfach, Germany.
- Aug. 2008, *Projective spectrum in Banach algebras*, International Workshop in Operator Theory, Williamsberg, VA, USA.
- June 2008, *A multiparameter spectrum for operator tuples*, Operator Theory and its Connections with Geometry and Topology, Qinghuangdao, China.
- July 2007, *Invariant subspaces in the Hardy space over the bidisk*, Extremal Problems in Real and Complex Analysis, Moscow, Russia.
- Apr. 2006, *Functional Spectrum of Contractions*, Analysis Seminar, Vanderbilt University, TN, USA.

- Apr. 2006, *Functional Spectrum of Contractions*, Operator Theory Workshop, SUNY at Buffalo, NY, USA.
- Oct. 2006, *Functional Spectrum of Contractions*, A.M.S meeting, Salt Lake City, UT, USA.
- Dec. 2005, *The defect operators of submodules*, Operator Theory Conference, Bangalore, India.
- July 2005, *The defect operators of two variable Jordan block*, Analytic Function Space Meeting, Niigata, Japan.
- Mar. 2005, *Two variable operator theory in the Hardy space*, Analysis Seminar, Texas A&M Univ., TX, USA.
- Feb. 2005, *Two variable operator theory in the Hardy space*, Wabash Seminar, Wabash, IN, USA.
- Dec. 2003, *A trace formula of isometric pairs*, Operator Theory Conference, Bangalore, India.
- June 2002, *Operator theory in the Hardy space over the bidisk*, Operators on Analytic function spaces, Niigata University, Japan.
- Mar. 2002, *Beurlings phenomenon over general complex domains*, Colloquium, Georgia State University, Atlanta, GA, USA.
- Mar. 2002, *Beurlings phenomenon over general complex domains*, Colloquium, University of Wyoming, Laramie, WY, USA.
- July 2001, *Beurlings phenomenon in two variables*, Young Analysts Meeting, Greenville, SC, USA.
- Dec. 2000, *Numerical invariants for submodules*, Colloquium, University of Georgia, Athens, GA, USA.
- Nov. 2000, *Numerical invariants for submodules*, University of Virginia Analysis seminar, Charlottesville, VA, USA.

PUBLICATIONS

55. K. Howell and R. Yang, *The characteristic polynomial of projections*, to appear in Linear Algebra and Applications.
54. R. Yang, *Joint spectra, group representations, and Julia sets*, arXiv:2301.01634.
53. P. Cui and R. Yang, *A note on joint spectrum in function spaces*, Complex Analysis and Operator Theory, 2023 (17:81).
52. W. He and R. Yang, *On unitary equivalence of compact operator tuples*, Sci. China Math. 66 (2023), 571-580.
51. S. Munshi and R. Yang, *Complex solutions to Maxwell's equations*, Complex Anal. Synerg. 8 (2022), no. 1, Paper No.2.
50. B. Goldberg and R. Yang, *Self-similarity and spectral dynamics*, J. Operator Theory 87 (2022), no. 2, 355-388.
49. R. Douglas and R. Yang, *Hermitian geometry on the resolvent set (II)*, Sci. China Math. 64 (2021), no. 2, 385-398.
48. F. Azari Key and R. Yang, *Spectral invariants of finite dimensional Lie algebras*, Linear Alg. and Appl. 611 (2021), 148-170.
47. M. Tran and R. Yang, *Hermitian metrics on resolvent set and extremal arc length*, Operator theory Adv. and Appl. 278, *Ronald G. Douglas Memorial Volume*, 487-499.
46. B. Goldberg and R. Yang, *Hermitian metric and the infinite dihedral group*, Proc.

Steklov. Inst. Math. 304 (2019), no. 1, 136–145.
45. R. Yang, *A brief survey of operator theory in $H^2(D^2)$*, Handbook of analytic operator theory, 223–258, CRC Press/Chapman Hall Handb. Math. Ser., CRC Press, Boca Raton, FL, 2019.
44. Y. X. Liang and R. Yang, *Energy functional of the Volterra operator*, Banach J. of Math., 13 (2019), no. 2, 255–274.
43. S. Munshi and R. Yang, *Self-adjoint elements in the pseudo-unitary group $U(p,p)$*, Linear Algebra and its Applications 560 (2019), 100–113.
42. Z. Hu and R. Yang, *On the characteristic polynomials of multiparameter pencils*, Linear Algebr. Appl. 558 (2018), 250-263.
41. S. Luo, K. Izuchi and R. Yang, *Hilbert-Schmidtness of some finitely generated submodules in $H^2(D^2)$*, J. Math. Anal. Appl. 465 (2018), 531–546.
40. Y. X. Liang and R. Yang, *Quasinilpotent operator and non-Euclidean metrics*, J. Math. Anal. Appl. 468 (2018) 939-958.
39. R. Douglas and R. Yang, *Hermitian geometry on resolvent set (I)*, Oper. Theory, Oper. Alg. and Matrix Theory, pp 167-184; Operator Theory: Adv. and Appl. 267, Birkhäuser, 2018.
38. F. Azarikey, Y. Lu and R. Yang, *Numerical invariants of homogeneous submodules in $H^2(D^2)$*, New York J. of Math. 23 (2017), 505-526.
37. R. Douglas and R. Yang, *Hermitian geometry on resolvent set (I)*, submitted, arxiv 1608.05990.
36. R. Grigorchuk and R. Yang, *Joint spectrum and infinite dihedral group*, Proc. of the Steklov Institute of Math., 2017, Vol. 297, 145-178.
35. Y. Qin and R. Yang, *A note on Rudin's pathological submodules in $H^2(D^2)$*. Intgr. Equ. Oper. Theory 88 (2017), No. 3, 363-372.
34. W. He, X. Wang and R. Yang, *Projective spectrum and kernel bundle(II)*, J. of Operator Theory 78 (2017), No. 2, 417-433.
33. M. Seto, Y. Wu and R. Yang, *Krein space representation and Lorentz groups of analytic Hilbert modules*, Sci. China. Math. Vol. 61 (2018) No. 4, 745-768.
32. W. He and R. Yang, *Projective spectrum and kernel bundle*. Sci. China. Math. Vol. 57 (2014), 1-10.
31. W. He, Y. Qin and R. Yang, *Numerical invariants of commuting isometric pairs*. Indiana Univ. Math. Journal Vol. 64 no. 1 (2015), 1-19.
30. Y. Yang and R. Yang, *A note on multi-variable Berger-Shaw theorem*. Houston J. of Math. 41 no. 1 (2015) 273-278.
29. K. Stulov and R. Yang, *An elementary inequality about Mahler measure*. Involve 6 (2013), no. 4, 393-397.
28. Y. Qin and R. Yang, *A Characterization of Submodules via Beurling-Lax-Halmos Theorem*. Proc. Amer. Math. Soc. 142 (2014), no. 10, 3505–3510.
27. P. Cade and R. Yang, *Projective spectrum and cyclic cohomology*. J. of Functional Analysis Vol. 265 No. 9 (2013), 1916-1933.
26. P. Cade, J. Bannon and R. Yang, *On the spectrum of operator-valued entire functions*. Illinois J. of Mathematics 55 No.4 (2011), 1455-1465.
25. C. Jiang and R. Yang, *Jordan blocks and strong irreducibility*. New York J. Math. 17 (2011), 619-626.
24. M. Stessin, K. Zhu and R. Yang, *Analyticity of a joint spectrum and a multivariable analytic Fredholm theorem*. New York J. Math. 17A (2011), 39-44.

23. Y. Lu, R. Yang and Y. Yang, *An index formula for the two variable Jordan block.* Proc. Amer. Math. Soc. 139 (2011), no. 2, 511-520.
22. R. Yang, *Projective spectrum in Banach algebras.* J. Topol. Anal. 1 (2009), no. 3, 289-306.
21. R. Yang, *A note on classification of submodules in $H^2(D^2)$.* Proc. Amer. Math. Soc. 137 (2009), no. 8, 2655-2659.
20. K. Izuchi and R. Yang, *N_ϕ-type quotient modules on the torus.* New York J. Math. 14 (2008), 431-457.
19. R. Yang, *Functional spectrum of contractions.* J. Funct. Anal. 250 (2007), no. 1, 68-85.
18. M. Seto and R. Yang, *Inner sequence based invariant subspaces in $H^2(D^2)$.* Proc. Amer. Math. Soc. 135 (2007), no. 8, 2519-2526.
17. R. Yang, *On two variable Jordan block (II).* Integral Equations Operator Theory 56 (2006), no. 3, 431-449.
16. R. Yang, *The core operator and congruent submodules.* J. Funct. Anal. 228 (2005), no. 2, 469-489.
15. R. Yang, *Hilbert-Schmidt submodules and issues of unitary equivalence.* J. Operator Theory 53 (2005), no. 1, 169-184.
14. K. Izuchi and R. Yang, Strictly contractive compression on backward shift invariant subspaces over the torus. Acta Sci. Math. (Szeged) 70 (2004), no. 1-2, 147-165.
13. K. Guo and R. Yang, *The core function of submodules over the bidisk.* Indiana Univ. Math. J. 53 (2004), no. 1, 205-222.
12. R. Yang, *Beurling's phenomenon in two variables.* Integral Equations Operator Theory 48 (2004), no. 3, 411-423.
11. R. Yang and K. Zhu, *The root operator on invariant subspaces of the Bergman space.* Illinois J. Math. 47 (2003), no. 4, 1227-1242.
10. R. Yang, *On two-variable Jordan blocks.* Acta Sci. Math. (Szeged) 69 (2003), no. 3-4, 739-754.
9. R. Yang, *A trace formula for isometric pairs.* Proc. Amer. Math. Soc. 131 (2003), no. 2, 533-541 (electronic).
8. R. Yang, *Operator theory in the Hardy space over the bidisk. II.* Integral Equations Operator Theory 42 (2002), no. 1, 99-124.
7. R. Yang, *Operator theory in the Hardy space over the bidisk. III.* J. Funct. Anal. 186 (2001), no. 2, 521-545.
6. R. Douglas and R. Yang, *Operator theory in the Hardy space over the bidisk.* I. Integral Equations Operator Theory 38 (2000), no. 2, 207-221.
5. R. Yang, *The Berger-Shaw theorem in the Hardy module over the bidisk.* J. Operator Theory 42 (1999), no. 2, 379-404.
4. R. Yang, *BCL index and Fredholm tuples.* Proc. Amer. Math. Soc. 127 (1999), no. 8, 2385-2393.
3. R. Yang, *Hardy modules.* Thesis (Ph.D) State University of New York at Stony Brook. 1998. 82 pp. ISBN: 978-0599-00491-7, ProQuest LLC.
2. R. Douglas and R. Yang, *Quotient Hardy modules.* Houston J. Math. 24 (1998), no. 3, 507-517.
1. R. Yang, *A cross section from invariant subspaces to inner functions.* Integral Equations Operator Theory 28 (1997), no. 2, 238-244.

SERVICES

Internal Services

- Executive Committee, Dept. of Math and Stat., Spring 2023-present.
- Hiring Committee, Chair, Dept. of Math and Stat., Fall 2023-Spring 2024.
- Academica Program Committee, Chair, College of Art and Sciences, Fall 2022-Spring 2024.
- University at Albany Asian Coalition of Professionals, Founding President, May 2021-Aug. 2023.
- Executive Committee, Dept. of Math and Stat., Fall 2016-Spring 2017.
- Graduate Academic Council, Chair of CA&AS, SUNY at Albany, Fall 2012-Spring 2013.
- University CPCA, SUNY at Albany, Fall 2010-Spring 2012.
- University Senate, SUNY at Albany, Fall 2010-Spring 2012.
- Researchers Liaison Committee, SUNY at Albany, Fall 2009-Spring 2011.
- Executive Committee, Dept. of Math and Stat., Fall 2010-Spring 2012.
- Graduate Committee, Dept. of Math and Stat., Fall 2008-Spring 2010.
- College Faculty Council, CAS, Fall 2008-Spring 2009.
- Colloquium Chair, Dept. of Math and Stat., Fall 2005-Spring 2007.
- Coordinator of Analysis Seminar, Dept. of Math and Stat., Fall 2003-present.
- Calculus Coordinator, Dept. of Math and Stat., Fall 2003-Spring 2005.

Professional Services

- *Special session in multivariable operator theory* (main organizer), July 26-Aug. 1, 2023, International Workshop in Operator Theory and Applications, Helsinky, Finland.
- *Joint spectra and related topics in representation theory and complex dynamics* (main organizer), May 2023, Banff Intl. Res. Station, Canada
- *Operator Theory, Operator Algebras and Their Interactions with Geometry and Topology* (Ronald G. Douglas Memorial Volume), Role: Chief Editor
- Workshop on Hilbert modules in analytic function space, Tsinghua Sanya International Mathematics Forum, 12/30/2019–1/3/2020, Role: Main Organizer.
- Northeastern Analysis Meeting 2017, Albany, New York, Oct. 2017, Role: Co-organizer.
- Workshop on Hilbert modules, Tsinghua Sanya International Mathematics Forum, May 2017, Role: Principal Organizer.
- American Mathematical Society Sectional Meeting, Cornell University, Sept., 2011. Role: Principal Organizer.
- Operator Theory and Its Connections with Geometry and Topology, Qinghuangdao, China, June, 2008. Role: Co-organizer.
- Workshop on Operator Theory, Fudan University, China, June, 2008. Role: Co-organizer.
- Workshop on submodules in $H^2(D^2)$, SUNY at Albany, March, 2008. Role: Organizer.
- Multivariable Operator Theory and Complex Analysis Meeting, Sapporo, Japan, August, 2006. Role: Co-organizer.
- Southeastern Analysis Meeting, Athens, Georgia, March, 2000. Role: Co-organizer.
- Journal Referee: Mathematical Review, Advances in Math., Journal of Functional Analysis, Journal of Operator Theory, Proc. of A.M.S, Journal of Math. Anal. and Appli., Canadian Journal of Math., Science in China, Journal of Complex Analysis

and Operator Theory, Integr. Equ. and Oper. Theory, Acta Sci. Math., Tohoku J. of Math.