

教授 (Professor)

小林 俊行 (KOBAYASHI Toshiyuki)

A. 研究概要

2014–2018 の 5 年間で、総計で約 1,500 ページの論文を著した。以下では 2018 年の文献は後述の「B. 発表論文」におけるリストの番号 [1], [2], … で表記し、2017 年以前の関連する論文はジャーナルの短縮形で引用する。

1. 対称性破れ作用素の構成と分類問題

筆者の長年のモチーフである「分岐則」に関して、定性的理論から定量的理論に移行する新しいプログラムを提起した (日本数学会 70 周年記念企画特別講演 (文献 [1], [Progr. Math. '15])).

1.A. (定性的理論 1—有限性) 無限次元表現の分岐則の重複度有限性を与える幾何的な必要十分条件を発見・証明し [Perspective Math. 2014], さらに、松木敏彦氏とその分類を完成した [Transf. Group 2014].

1.B. (定性的理論 2—離散性) 分岐則の離散性の判定条件 (Ann. Math., Invent. Math.) を極小表現に適用して離散的な分岐則の生じるケースを分類した [Crelle J. 2015] (大島 (芳) と共著)。

1.C. (定量的理論 1—微分作用素として表せる対称性破れ作用素) 対称性破れ作用素の系統的な構成法 (F-method) を提唱し、さまざまな幾何的設定において F-method を適用し、Pevzner, Souček, Ørsted, 久保氏 等と共同で、Rankin–Cohen 作用素や Juhl の共形不変な作用素の一般化する新しい微分作用素の族を構成した ([Adv. Math. 2015], [Selecta Math. 2016], 著書 [2]).

1.D. (定量的理論 2—対称性の破れの分類理論) 簡約リ一群の対称性破れ作用素を、非局所作用素まで含めて構成し、それを完全に分類するという問題を提起し、その最初の成功例を与えた (著書 [1], B. Speh と共同)。行列値への拡張は著書 [3], 高階への拡張は文献 [10] で与えた。

2. 極小表現の大域解析

筆者は、表現論内部の問題意識とは逆の視点で、極小表現とよばれる「小さな無限次元表現」をモチーフとした新しい大域解析の可能性を提唱した。特に L^2 模型の理論 (Memoirs AMS, 2011) の 1 つの応用として、保型形式における、ある重複度 1 定理を証明した (G. Savin と共同, [Math. Z. 2015]).

3. 不連続群

筆者の長年のモチーフである「リーマン幾何学

の枠組を越えた不連続群」について、スペクトル理論の構築に初めて踏み込んだ。幾何学的な準備として、離散群の作用の不連続性を量的に評価する sharpness という概念を導入し、高次元タイヒミュラー空間上で安定な離散スペクトラムを構成し、長編の論文 [Adv. Math. 2016] を出版した。さらに“安定でない”スペクトラムを捉えるための理論整備として、文献 [4] および [Progr. Math. 2017] で隠れた対称性を用いた微分作用素環の構造定理を証明した。

4. 非対称空間の大域解析

幾何学的群論の手法を援用し、非対称空間 G/H の正則表現が L^p 緩増加となるための必要十分条件を H が簡約の場合に証明し [J. Euro. Math. 2015], それを H が一般の場合に拡張した (Y. Benoist と共同, 文献 [3])。

5. 可視的作用と無重複表現

複素多様体における可視的作用という概念を導入し無重複性の伝播定理を証明し、無重複表現の統一的な構成を与えた (口頭発表 [9])。

For the last five years, I have been working on the following research topics.

1. Analysis on manifolds with group symmetries

This is a challenge to the global analysis on homogeneous spaces beyond symmetric spaces.

1.A I introduced a notion of *real spherical manifolds* and established a geometric criterion for finite multiplicities in the induced/restricted representations [Adv. Math. 2013] with T. Oshima.

1.B I classified all symmetric pairs that yield finite-multiplicity branching laws in [Trans. Group, 2014] with T. Matsuki based on the criterion given in [Perspective Math. 2014] and [Adv. Math. 2013].

1.C Jointly with Y. Benoist [J. Euro. Math. '15], we proved a criterion for L^p -temperedness of the regular representation on G/H in the generality that $G \supset H$ are pair of reductive groups, and in [3] for general H .

2. Analysis on minimal representations

Minimal representations are one of building blocks of unitary representations. Classic examples are the Weil representation. I proposed a *geometric approach* to minimal representa-

tions, by which we could expect a fruitful theory on global analysis by *maximal symmetries*. As an application of the theory of *unitary inversion operator* on the L^2 -model that generalizes the Euclidean Fourier transform with G. Mano ([Memoirs of AMS, **1000**, (2011)]), we proved a global multiplicity-one theorem in automorphic form theory with G. Savin in [Math. Z. 2015].

3. Multiplicity-free representations

I established the propagation theorem of multiplicity-freeness, which produces various multiplicity-free results as synthetic applications of the original theory of *visible actions* on complex manifolds.

4. Analysis on locally symmetric spaces—beyond the Riemannian case

Developing my long motif on discontinuous groups for non-Riemannian homogeneous spaces, I initiated the study on global analysis on locally non-Riemannian symmetric spaces with F. Kassel in [Adv. Math. 2016] and proved the existence of “stable spectrum” under deformation of discontinuous groups. A further new idea is proposed in [Progr. Math. 2017] and [4].

5. Restriction of representations: Branching problems and symmetry breaking operators

5.A I accomplished the classification of the symmetric pairs $(\mathfrak{g}, \mathfrak{h})$ for which there exists an infinite-dimensional representation of G whose restriction to H is discretely decomposable in [Crelle 2015] with Y. Oshima.

5.B In the BGG category \mathcal{O} , I proposed a new effective method to find singular vectors (‘ F -method’ [Contemp. Math. AMS, 2013]), and joint with B. Ørsted, V. Souček, P. Somberg, M. Pevzner, and T. Kubo determined explicit formulae of covariant differential operators in various geometric settings ([Adv. Math. 2015], [Selecta Math. 2016], and book [2]).

5.C With B. Speh, I classified *symmetry breaking operators* of spherical principal series for a pair of Lorentz groups (books [1,3]). A part of this work is extended to higher rank case [10].

B. 発表論文

1. 小林俊行, 表現の分岐則の最近の進展, 日本数学会 70 周年記念, 『数学』, 論説, 29

pages, to appear.

2. T. Kobayashi and M. Pevzner, Inversion of Rankin–Cohen operators via holographic transform, preprint. 52 pages. arXiv: 1812.09733.
3. Y. Benoist and T. Kobayashi, Tempered homogeneous spaces, submitted for a special volume for Margulis, 32 pages. arXiv: 1706.10131. Submitted for a special volume for Margulis.
4. F. Kassel and T. Kobayashi, Invariant differential operators on spherical homogeneous spaces with overgroups, preprint. 91 pages, accepted for publication in J. Lie Theory, arXiv: 1810.02803.
5. T. Kobayashi, Conformal symmetry breaking on differential forms and some applications, In: Geometric Methods in Physics XXXVI, Trends in Math., pp. 289–308, Springer Nature, Switzerland AG 2019.
6. T. Kobayashi and B. Speh, Symmetry breaking for orthogonal groups and a conjecture by B. Gross and D. Prasad, In: Geometric Aspects of the Trace Formula, Simons Symposia, Springer, Cham. (2018), pp. 245–266.
7. T. Kobayashi: “Residue Formula for Regular Symmetry Breaking Operators”, Contemporary Mathematics, **714**, p.p. 175–193. Amer. Math. Soc., 2018.
8. T. Kobayashi and S. Nasrin, Geometry of coadjoint orbits and multiplicity-one branching laws for symmetric pairs algebras and representation theory. Algebras and Representation Theory, **21**(2018), pp. 1023–1036. Special volume in honor of Alexandre Kirillov.
9. T. Kobayashi, T. Kubo, and M. Pevzner. “Conformal symmetry breaking operators for anti-de Sitter spaces”. In Geometric Methods in Physics XXXV, Trends in Mathematics, pages 69–85. Birkhäuser, Springer, 2018.

10. T. Kobayashi and A. Leontiev. Image of conformally covariant, symmetry breaking operators for $\mathbb{R}^{p,q}$. In V. Dobrev, editor, Quantum Theory and Symmetries with Lie Theory and Its Applications in Physics. Volume 1. LT-XII/QTS-X 2017, Springer Proceedings in Mathematics & Statistics **263**, pages 3–31, 2018.
11. T. Kobayashi. Global geometry and analysis on pseudo-Riemannian locally symmetric spaces, In Proceedings of the Symposium on Representation Theory 2018 held at Tottori (eds. J. Inoue and Y. Mori), Japan, pages 89–98, 2018.
12. T. Kobayashi. Global geometry and analysis on pseudo-Riemannian locally symmetric spaces, 不定値計量の局所対称空間の大域幾何と解析、第 65 回幾何学シンポジウム予稿集 (編集: 今野宏氏) 2018, 10 pages.
13. T. Kobayashi, A. Leontiev, Double Gegenbauer expansion of $|s-t|^\alpha$, Integral Transforms and Special Functions, Published Online, 2019.
14. T. Kobayashi, A. Leontiev, 2 つの Gegenbauer 多項式を含むある積分公式 (A certain integral formula containing two Gegenbauer polynomials) 数理解析研究所講究録 **2077** “表現論とその周辺分野の広がり” (阿部紀行氏編集), (2018), pp. 22–35.

著書:

1. T. Kobayashi and B. Speh, “Symmetry Breaking for Representations of Rank One Orthogonal Groups”, Mem. Amer. Math. Soc., **238**, アメリカ数学会, 2015 年, v+112 pages. ISBN: 978-1-4704-1922-6.
2. T. Kobayashi, T. Kubo, and M. Pevzner. Conformal Symmetry Breaking Operators for Differential Forms on Spheres, Lecture Notes in Mathematics. **2170**, Springer, 2016 年, ix+192 pages. ISBN: 978-981-10-2656-0.
3. T. Kobayashi and B. Speh. Symmetry Breaking for Representations of Rank One

Orthogonal Groups II, **2234** of Lecture Notes in Mathematics. Springer, 2018, xv+342 pages. ISBN:978-981-13-2900-5.

4. T. Kobayashi. 分担執筆, 解説:リー群の表現論における最近の進展, In: 杉浦光夫『ユニタリ表現入門』, pages 214–242. 東京図書, 2018.

C. 口頭発表

1. Semisimple Symmetric Spaces and Discontinuous Groups: What I Learned from Professor Toshio Oshima. 大島利雄先生古希記念研究集会. Josai University, Tokyo, Japan, 26-27 December 2018.
2. Global Geometry and Analysis on Locally Symmetric Spaces—Beyond the Riemannian Case. (**2.A.**–**2.P.** では講演タイトル, 内容は個々に異なるが, 大きなテーマとしては同じなので 1 つにまとめる.) **2.A.** “Geometric Quantization and Applications” M. Vergne 教授記念集会. Luminy, France, 8-12 October 2018. **2.B.** Symposium on Representation Theory 2018. Tottori, Japan, 13-16 November 2018. **2.C.** Colloquium. Hiroshima University, Japan, 6 November 2018. **2.D.** (plenary lecture). The 65th Geometry Symposium. Tohoku University, Sendai, Japan, 28-31 August 2018. **2.E.** Glances at Manifolds: Aleksy Tralle 教授還暦記念研究集会. the Jagiellonian University, Krakow, Poland, 2-6 July 2018. **2.F.** Analysis on Manifolds with Symmetries and Related Structures. University of Bath, UK, 28-29 June 2016. **2.G.** Workshop: Deformation of Discrete Groups and Related Topics. Nagoya University, Nagoya, Japan, 17-18 February 2015. **2.H.** The 11th International Workshop: Lie Theory and Its Applications in Physics (LT-11). Varna, Bulgaria, 15-21 June 2015. **2.I.** 談話会. Kyushu University, Fukuoka, Japan, 15 January 2015. **2.J.** Harmonic Analysis, Group Representations, Automorphic Forms and Invariant Theory: in honour of Roger Howe celebrat-

- ing his 70th birthday (Howe 教授 70 歳記念研究集会). Yale University, USA, 1-5 June 2015. **2.K.** Seminar. Institut Élie Cartan de Lorraine, Nancy, France, 15 October 2015. **2.L.** Workshop: Branching Laws, Quantum Ergodicity, Wave Front Sets & Resonances (organized by M. Pevzner and P. Ramacher. Reims, France, 23-24 October 2015. (2 lectures). **2.M.** Symposium on Representation Theory 2015, 伊豆長岡, Shizuoka, Japan, 17-20 November 2015. **2.N.** 談話会. Tohoku University, Sendai, Japan, 15 December 2014. **2.O.** 談話会. The University of Tokyo, Tokyo, Japan, 11 July 2014. **2.P.** “Rigidity in geometry and spectral analysis on non-Riemannian locally homogeneous manifolds”, Workshop: Deformation of Discrete Groups and Related Topics. Nagoya University, Nagoya, Japan, 17-18 February 2015.
3. The Kemeny Lectures 2017, I. “Universal sounds” of anti-de Sitter manifolds. The Kemeny lectures, II. Local to global-geometry of symmetric spaces with indefinite-metric, III. Analysis on locally pseudo-Riemannian symmetric spaces. Dartmouth College, USA, 3-5 May 2017.
 4. Analysis of minimal representations-an approach to quantize nilpotent orbits. (4.A.–4.C. では講演タイトル, 内容は個々に異なるが, 大きなテーマとしては同じなので 1 つにまとめる.) **4.A.** Representation Theory at the Crossroads of Modern Mathematics: Alexandre Kirillov 教授 81 歳記念研究集会. Reims, France, 29 May-2 June 2017. **4.B.** (2 lectures). Analytic Representation Theory of Lie Groups. Kavli IPMU, The University of Tokyo, Japan, 1-4 July 2015. **4.C.** Conformal Geometry and Branching Problems in Representation Theory. Symposium on Representation Theory 2016. Okinawa, Japan, 29 November 29-2 December 2016. (連続講演).
 5. Symmetry Breaking Operators in Conformal Geometry. (5.A.–5.J. では講演タイトル, 内容は個々に異なるが, 大きなテーマとしては同じなので 1 つにまとめる.) **5.A.** Journées SL2R de théorie des représentations et analyse harmonique (Hubert Rubenthaler 教授退官記念研究集会). I.R.M.A., University of Strasbourg, France, 22-23 March 2018. **5.B.** (opening lecture). Joint meeting of X. International Symposium: Quantum Theory and Symmetries and XII. International Workshop: Lie Theory and Its Applications in Physics. Varna, Bulgaria, 19-25 June 2017. **5.C.** (plenary lecture), the XXXV Workshop on Geometric Methods in Physics. Bialowieza, Poland, 2-8 July 2017. **5.D.** Symposium on Representation Theory 2017. Isawa, Yamanashi, Japan, 28 November-1 December 2017. (plenary lecture), 日本. **5.E.** “Geometry and Analysis on Locally Symmetric Spaces with Indefinite-metric—after 145 years of Klein’s Erlangen Program”. Colloquium. Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, 25 July 2017. **5.F.** Sophus Lie Seminar. Göttingen, Germany, 30 June-1 July 2017. **5.G.** Harmonic Analysis and the Trace Formula. Oberwolfach, Germany, 21-27 May 2017. **5.H.** AMS Special Session on Harmonic Analysis (Olafsson 教授 65 歳記念研究集会). Atlanta, USA, 4 January 2017. **5.I.** Conference on Geometry, Representation Theory and the Baum-Connes Conjecture (Baum 教授 80 歳記念研究集会). The Fields Institute, Toronto, Ontario, Canada, 18-22 July 2016. **5.J.** Geometry, Representation Theory, and Differential Equation, Kyushu University, Japan, 26-19 February 2016.
 6. F-method for Constructing Symmetry Breaking Operators. (6.A.–6.C. では講演タイトル, 内容は個々に異なるが, 大きなテーマとしては同じなので 1 つにまとめる.) **6.A.** I. Abstract Branching Laws for Unitary Highest Weight Modules and

- Localness Theorem. **6.B.** V. Some Further Perspectives from the General Theory. (**6.A.** と **6.B.** は The 20th Hakuba Workshop on Number Theory in 2017: Automorphic Differential Operators on Siegel Modular Forms (organized by T. Ibukiyama の 5 回連続講演 (分担) の 2 つ). Nagano, Japan, 3-7 September 2017.)
- 6.C.** F-method III. Geometry, Representation Theory, and Differential Equations. Kyushu University, 16-19 February 2016.
7. Birth of New Branching Problems. 日本数学会 70 周年記念 企画特別講演, 日本数学会 秋季総合分科会, Kansai University, Japan, 15-18 September 2016.
8. Branching Laws for Infinite Dimensional Representations of Real Lie Groups; Symmetry Breaking Operators. (**8.A.**–**8.L.** では講演タイトル, 内容は個々に異なるが, 大きなテーマとしては同じなので 1 つにまとめる.) **8.A.** Joachim Hilgert 教授 還暦記念研究集会. Paderborn, Germany, 23-27 July 2018. **8.B.** (plenary lecture). the 32nd International Colloquium on Group Theoretical Methods in Physics (Group32). Czech Technical University, Prague, Czech Republic, 9-13 July 2018. **8.C.** Representation theory, geometry, and quantization: the mathematical legacy of Bertram Kostant. MIT, USA, 28 May-1 June 2018. **8.D.** Representations of reductive groups: (David Vogan 教授 還暦記念研究集会) (organized by R. Bezrukavnikov, P. Etingof, G. Lusztig, M. Nevins, and P. Trapa). MIT, USA, 19-23 May 2014. **8.E.** Representation Theory and Groups Actions. The University of Tokyo, Tokyo, Japan, 12 July 2014. **8.F.** Workshop on New Developments in Representation Theory (opening lecture), Singapore, 14 March 2016. **8.G.** (2 回連続講演) Berkeley-Tokyo Winter School: Geometry, Topology and Representation Theory. University of California, Berkeley, USA, 8-19 February 2016. **8.H.** (opening lecture). Journées SL2R (Strasbourg, Lorraine, Luxembourg, Reims): Théorie des Representations et Analyse Harmonique. Institut Elie Cartan de Lorraine, France, 9-10 June 2016. **8.I.** Analysis, Geometry and Representations on Lie Groups and Homogeneous Spaces (河添健教授および Ahmed Intissar 教授の還暦記念研究集会). Marrakech, Morocco, 8-12 December 2014. **8.J.** Symmetry Breaking Operators and Branching Problems. Symposium on Representation Theory 2014. Awajishima, Japan, 25-28 November 2014. (連続講演) **8.K.** Symmetry Breaking Operators and Branching Problems. Algebraic Geometry Seminar. Zurich University, Switzerland, 6 October 2014. **8.L.** Symmetry Breaking Operators for Rank One Orthogonal Groups. Prehomogeneous Vector Spaces and Related Topics (organized by Slupinski, Soufaifi, Y. Hironaka, H. Ochiai; scientific advisors: Rubenthaler and F. Sato). Rikkyo University, Tokyo, Japan, 1-5 September 2014.
9. Visible Actions and Multiplicity-free Representations. XVIth International Conference on Geometry, Integrability and Quantization. Varna, Bulgaria, 6-11 June 2014.
10. Finite Multiplicity Theorems and Real Spherical Varieties. (**10.A.**–**10.C.** では講演タイトル, 内容は個々に異なるが, 大きなテーマとしては同じなので 1 つにまとめる.) **10.A.** 松木敏彦教授 還暦記念研究集会. Tottori, Japan, 8-9, February 2014. **10.B.** Representation Theory and Analysis of Reductive Groups: Spherical Spaces and Hecke Algebras Oberwolfach, Germany, 19-25 January 2014. **10.C.** 松本久義氏 還暦記念研究集会, Tokyo, March 27-29, 2019.

D. 講義

1. 数理科学概論 I: フェルミ推定, 微積分, Taylor 展開, 偏微分, Lagrange の未定乗数法, 近似と概算, 微分方程式の初歩, 多変数関数の積分を講義し, 約 200 題の演習で講義を補った. (教養学部文科 1, 2 年生)

2. 数物先端科学 IV・幾何学 XH: Representation Theory of Real Reductive Groups. I start with the interaction of representation theory of Lie groups with various branches of mathematics, and explain the fundamental role of reductive groups. I exploited Benoist–Kobayashi’s criterion for tempered homogeneous spaces by using geometric group theory, and also a state-of-the-art of the classification theory of irreducible (infinite-dimensional) representations of real reductive Lie groups such as Langland’s classification, Vogan’s classification, and the one based on \mathcal{D} -modules. A short discussion of the orbit method as a *geometric quantization* of coadjoint orbits which are typical examples of homogeneous symplectic manifolds are also discussed. For broad audience, structure theory of real reductive Lie groups such as maximal compact subgroups and the Cartan decomposition, and reductive pairs such as symmetric pairs are included followed by some applications such as the criterion for the Calabi–Markus phenomenon for discontinuous groups.

(数理大学院・4年生共通講義)

3. 数学講究 XB (数理科学概説)「対称と大域解析」, (理学部数学科 4年生), 2018年5月9日.
4. 数学講究 XA, 数学特別講究, 通年: テキスト Berline–Getzler–Vergne, “Heat Kernels and Dirac Operators” (理学部数学科 4年生)
5. 「対称性と大域解析」広島大学集中講義, 2018年11月5–9日. フーリエ級数と熱方程式、正定値ではない計量をもつ多様体 (擬リーマン多様体) 上のラブラシアンと等長変換群, 球面調和関数, 定曲率をもつ擬リーマン対称空間上の調和解析についての解説を行った後, (擬リーマン) 対称空間の等長な不連続群による商として得られる局所対称空間上の解析に関して, 3次元反ドジッター多様体の例と用いながら, 最新のトピックを紹介した.

6. Representations of Lie groups, Yale University, 2019. An introduction to infinite-dimensional representations of Lie groups by geometric and analytic methods with basic examples, followed by some recent topics on symmetry breaking (restriction of representations). (大学院・専門家)

E. 修士・博士論文

- (課程博士) 田内大渡 (TAUCHI Taito): Relationship between orbit decompositions on flag varieties and multiplicities of induced representations. (旗多様体上の軌道分解と誘導表現の重複度の関係性について)
- (課程博士) 島本直弥 (SHIMAMOTO Naoya): On orbit decompositions of multiple flag varieties. (多重旗多様体の軌道分解について)
- (修士) 里見貴志 (SATOMI Takashi): 算術的組み合わせ論による等質空間上のたたみ込みのスペクトル評価.

F. 対外研究サービス

- Kavli IPMU(数物宇宙連携機構), 上席科学研究員併任 (2009.8–2011.5); 主任研究員 (Principal Investigator) 併任 (2011.6–)

[ジャーナルのエディター]

- Editor in Chief, Japanese Journal of Mathematics (日本数学会-Springer-Nature) (2006–)
- Editor, International Mathematics Research Notices (Oxford 大学出版) (2002–)
- Editor in Chief, Takagi Booklet, vol. 1–22 (日本数学会) (2006–)
- Editor, Geometriae Dedicata (Springer) (2000–)
- Editor, Advances in Pure and Applied Mathematics (de Gruyter) (2008–)
- Editor, International Journal of Mathematics (World Scientific) (2004–)

8. Editor, Journal of Mathematical Sciences, The University of Tokyo (2007–)
 9. Editor, Kyoto Journal of Mathematics (2010–)
 10. Editor, Representation Theory (アメリカ数学会) (2015–2019)
 11. Editor, AMS Translation Series (アメリカ数学会) (2016–)
 12. Editor, Tunijian Journal of Mathematics (2017–)
 13. Editor, Special Issue in commemoration of Professor Kunihiko Kodaira's centennial birthday (J. Math. Sciences, The University of Tokyo) (2015).
 14. Editor, Special Issue in honor of Professor Masaki Kashiwara's 70th birthday (Publ. RIMS) 2017–.
 15. Chief Editor, Mikio Sato's Collected Papers, (Springer-Nature).
 16. 共立出版, 『共立講座 数学探検 (全 18 巻)』, 『共立講座 数学の魅力 (全 14 巻+別巻 1)』, 『共立講座 数学の輝き (全 40 巻予定)』の 3 シリーズ編集委員
 17. 編集委員, 数学の現在 i, e, π , (with 斎藤毅, 河東泰之), 東京大学出版会, 2016.
- [学会・他大学の委員など]
18. Prize Committee (International Prize, 数学部門, 国外) 2018.
 19. 審査委員: European Research Council (2010–)
 20. 京都大学数理解析研究所運営委員 (2015–2017; 2017–2019)
 21. 京都大学数理解析研究所専門委員 (2007–2009; 2009–2011; 2015–2017; 2017–2019)
 22. 科学研究費等の審査委員: 日本 (JSPS), 米国 (NSF-AMS), EU, ドイツ, ルクセンブルク, 中華人民共和国・香港 (various years)
 23. 審査委員: Prize Committee 日本数学会春季賞・秋季賞他 (anonymous) (various years)
- [国際研究集会のオーガナイザーなど]
24. オーガナイザー, 高木レクチャー, 第 22 回 (東京大学, 2018 年 11 月) (with Y. Kawahigashi, T. Kumagai, H. Nakajima, K. Ono and T. Saito).
 25. オーガナイザー, Summer School on Representation Theory, リー群の群作用と大域解析に関するセミナー, 玉原国際セミナーハウス, 19–23 August 2018.
 26. オーガナイザー, 高木レクチャー, 第 21 回 (京都大学数理研, 2018 年 6 月), (with Y. Kawahigashi, T. Kumagai, H. Nakajima, K. Ono and T. Saito).
 27. オーガナイザー, Summer School on Representation Theory, リー群の群作用と大域解析に関するセミナー, 玉原国際セミナーハウス, 16–20 August 2017.
 28. Scientific Committee, Visible Actions and Multiplicity-free Representations. XVIIth International Conference on Geometry, Integrability and Quantization. Varna, Bulgaria, 2016.
 29. オーガナイザー, Summer School on Representation Theory, リー群の群作用と大域解析セミナー, 玉原国際セミナーハウス, 10–14 August 2016.
 30. オーガナイザー, Winter School 2016 on Representation Theory of Real Reductive Groups, 東京大学大学院数理科学研究科, 22–27 January 2016. Coorganized with Toshihisa Kubo and Hideko Sekiguchi.
 31. オーガナイザー, Summer School on Representation Theory, リー群の群作用と大域解析セミナー, 玉原国際セミナーハウス, 4–8 August 2015.
 32. オーガナイザー, Analytic representation theory of Lie groups, 1–4 July 2015, Kavli 数物連携宇宙研究機構, 東京大学.
 33. オーガナイザー, Winter School 2015 on Representation Theory of Real Reductive Groups, 東京大学大学院数理科学研究科, 24–26 January 2015. Coorganized with

- Toshihisa Kubo, Hisayosi Matumoto and Hideko Sekiguchi.
34. オーガナイザー, Summer School on Representation Theory, 玉原国際セミナーハウス, 28–31 August 2014.
 35. オーガナイザー, Winter School on Representation Theory of Real Reductive Groups, 東大, 15–18 February 2014, (with T. Kubo, H. Matumoto and H. Sekiguchi).
 36. オーガナイザー, 高木レクチャー, 第 14 回 (東京大学, 2014 年 5 月), 第 15 回 (東北大学, 2015 年 6 月), 第 16 回 (東京大学, 2015 年 11 月), 第 17 回 (京都大学数理研, 2016 年 6 月), 第 18 回 (東京大学, 2016 年 11 月), 第 19 回 (京都大学数理研, 2017 年 7 月), 第 20 回 (東京大学, 2017 年 11 月) (with Y. Kawahigashi, H. Nakajima, K. Ono and T. Saito)
 37. オーガナイザー, リー群論・表現論セミナー (2007–present 東大; 2003–2007 RIMS; 1987–2001 東大)
2. Michael Pevzner, Reims University, France, November 16–17, 2018, 対称性破れ作用素に関する講演を行った.
 3. Arghya Mondal, Tata Institute, India, November 16–21, 2018, 表現の分岐則のモジュラー多様体への応用についての講演を行った.
 4. Ali Baklouti, Sfax University, Tunisia, December 1–4, 2018, 非リーマン等質空間への不連続群および可視的作用に関する議論を行った.

G. 受賞

1. 日本数学会出版賞 (2019) 『数学の現在 i, e, π 』 東京大学出版会, (斎藤毅氏, 河東泰之氏との共同受賞),
2. アメリカ数学会フェロー (2017) 「簡約リー群の構造論と表現論に対する貢献」 (Contribution to Structure Theory and Representation Theory of Reductive Lie groups)
3. 2015 JMSJ 論文賞 (The JMSJ Outstanding Paper Prize) 「極小表現の構成に関する論文 Minimal representations via Bessel operators」に関して」 (J. Hilgert, J. Möllers との共同受賞)
4. 紫綬褒章 (Medal with Purple Ribbon)(2014) 数学研究

H. 海外からのビジター

1. Paul Frank Baum, Pennsylvania State University, USA, October 17–November 3, 2018, K 理論と Dirac 作用素についての連続講義を行い, また離散群の変形とユニタリ表現に関する議論を行った.