

## Curriculum Vitae of Toshiyuki KOBAYASHI

**Born** September 1962 at Osaka (Japan)

### Present Business Address

Graduate School of Mathematical Sciences, The University of Tokyo,  
3-8-1 Komaba, Meguro, Tokyo, 153-8914, Japan  
Fax: +81-3-5465-7011 (secretary); Tel: +81-3-5465-7001 (secretary)  
e-mail: toshi@ms.u-tokyo.ac.jp

### Academic Degrees

Ph.D./Doctor of Science: 1990 The University of Tokyo  
M.A.: 1987 The University of Tokyo  
B.S./A.B.: 1985 The University of Tokyo

### Former and Present Professional Positions

April 2007 – : The University of Tokyo, Full Professor  
April 2003 – March 2007: RIMS, Kyoto University, Full Professor  
October 2001 – March 2003: RIMS, Kyoto University, Associate Professor  
April 1991 – September 2001: The University of Tokyo, Associate Professor  
April 1987 – March 1991: The University of Tokyo, Joshu

### Invited Positions

Harvard University, U.S.A. (2000–2001, 2008)  
Mittag-Leffler Institute, Sweden (1995–1996)  
Institute for Advanced Study, Princeton, U.S.A. (1991–1992)

### Visiting Appointments (short-term)

Max-Planck-Institut für Mathematik, Bonn, Germany (summer, 2007)  
Paderborn University, Germany (summer, 2006)  
Université de Poitiers, France (spring, 2005)  
Université de Paris VII, France (spring, 2003)  
Université de Poincaré, France (spring, 2003)  
Institute for Mathematical Sciences, Singapore (autumn, 2002)  
MSRI, Berkeley, USA (autumn, 2001)  
Odense University, Denmark (2000, 1998, 1996, 1994, 1992)  
Université de Paris VI, France (spring, 1999)  
Université de Lyon I, France (spring, 1998)

### Service

Member, Science Council of Japan (2006– )  
Board of Trustees, Mathematical Society of Japan (2003–2005; 2005–2007).

### Awards, Academic Honors

2006/2007: Sackler Distinguished Lecturer, Israel  
2007: JSPS Prize, awarded by the Japan Society for the Promotion of Science  
2006: Osaka Science Prize, awarded by Osaka Prefecture, Osaka City and  
Osaka Science & Technology Center  
1999: Spring Prize, awarded by the Mathematical Society of Japan  
1997: Takebe Prize, awarded by the Mathematical Society of Japan

## Editorial Boards

Japanese Journal of Mathematics (Managing Editor, 2005– ), Springer.  
Journal of Mathematical Sciences, The University of Tokyo (2007– )  
International Mathematics Research Notices, Oxford University Press (2002– ).  
International Mathematics Research Papers, Oxford University Press (2005– ).  
Geometriae Dedicata, Springer (2000– ).  
International Journal of Mathematics, World Scientific (2004– ).  
Publications RIMS (2003–2007).  
Journal of Mathematical Society of Japan (1998–2006),  
Editor in Chief (2002–2004; 2004–2006).

## Selected invited addresses

Conference in honor of S. Helgason, Iceland (2007)  
Conference in honor of T. Sunada, Japan (2007)  
Conference on representation theory, at MPI (closing lecture), Germany (2007)  
Seminar Sophus Lie in honor of E. B. Vinberg (opening lecture), Germany (2007)  
Summer Solstice Days, Université de Paris 6 & 7, France (2007)  
Sackler Distinguished Lectures in Pure Mathematics, Israel (2007)  
Award Lecture of Osaka Science Prize, Japan (2006)  
Conference in honor of H. Abels, Germany (2006)  
Conference in honor of S. Kaneyuki, Japan (2006)  
Conference in honor of R. Howe (opening lecture), Singapore (2006)  
Conference in honor of R. Parthasarathy, India (2006)  
Asian Mathematical Congress, Singapore (2005)  
Seminar Sophus Lie in honor of J. Faraut, France (2005)  
Pan-African Congress of Mathematicians (plenary address), Tunisia (2004)  
Conference in honor of G. van Dijk, Netherland (2004)  
Conference, Lie groups and representation theory, Denmark (2004)  
Conference, Oberwolfach (opening lecture), Germany (2004)  
ICM 2002, Beijing, China (2002)  
Conference on Integral Geometry at MSRI, Berkeley, USA (2001)  
Harvard University (series lectures), USA (2001)  
European School on Group Theory (series lectures), Denmark (2000)  
Conference, Oberwolfach (opening lecture), Germany (2000)  
Award Lecture of Spring Prize, Japan (1999)  
Göttingen Colloquium, Germany (1999)  
Seminar Sophus Lie, Germany (1999)  
Summer Solstice Days, Université de Paris 6 & 7, France (1999)  
Round Table in Global Pseudo-Riemannian Geometry, Nancy, France (1998)  
The Gelfand Seminar, USA (1997)  
Conference on Analysis on Lie groups and homogeneous spaces, Denmark (1997)  
Summer Solstice Days, Université de Paris 6 & 7, France (1996)  
Annual Meeting of Swedish Mathematical Society, Lund, Sweden (1995)  
European School on Group Theory (series lectures), Denmark (1994)  
Workshop in honor of S. Helgason, Denmark (1992)  
Colloquium at Columbia University, USA (1992)  
Conference on Harmonic analysis on Lie groups, Denmark (1991)

## Publications

### Selected papers

- [9] *Proper action on a homogeneous space of reductive type*, Math. Ann. **285** (1989), 249–263.
- [20] *A necessary condition for the existence of compact Clifford-Klein forms of homogeneous spaces of reductive type*, Duke Math. J. **67** (1992), 653–664.
- [27] *Discrete decomposability of the restriction of  $A_q(\lambda)$  with respect to reductive subgroups and its applications*, Invent. Math. **117** (1994), 181–205.
- [41] *Invariant measures on homogeneous manifolds of reductive type*, J. reine und angew. Math. **490** (1997), 37–53.
- [45] *Discrete decomposability of the restriction of  $A_q(\lambda)$  with respect to reductive subgroups II — micro-local analysis and asymptotic  $K$ -support*, Annals of Math. **147** (1998), 709–729.
- [47] *Discrete decomposability of the restriction of  $A_q(\lambda)$  with respect to reductive subgroups III — restriction of Harish-Chandra modules and associated varieties*, Invent. Math. **131** (1998), 229–256.
- [60] *Discontinuous groups for non-Riemannian homogeneous spaces*, Mathematics Unlimited — 2001 and Beyond (B. Engquist and W. Schmid, eds.), Springer-Verlag, 2000, pp. 723–748.
- [62] *Branching problems of unitary representations*, Proceedings of ICM, Beijing 2002, **2** (2002), 615–627.
- [69, 70, 71] with B. Ørsted, *Analysis on minimal representations of  $O(p, q)$* , I, II, III, Adv. Math. **180** (2003), 486–512; 513–550; 551–595.
- [83] *Multiplicity-free representations and visible actions on complex manifolds*, Publ. RIMS **41** (2005), 497–549, special issue commemorating the fortieth anniversary of the founding of RIMS.
- [86] with T. Yoshino, *Compact Clifford-Klein forms of symmetric spaces — revisited*, Pure and Appl. Math. Quarterly **1** (2005), 603–684, Special Issue: In Memory of Professor Armand Borel.
- [106] with G. Mano, *The inversion formula and holomorphic extension of the minimal representation of the conformal group*, Harmonic Analysis, Group Representations, Automorphic Forms and Invariant Theory: In Honour of Roger E. Howe (Jian-Shu Li, Eng-Chye Tan, Nolan Wallach, and Chen-Bo Zhu, eds.), Singapore University Press and World Scientific Publishing, 2007, pp. 159–223, ISBN 978-9812770783.
- [112] *Visible actions on symmetric spaces*, Transformation Groups **12** (2007), 671–694.

### Books

- [18] *Singular Unitary Representations and Discrete Series for Indefinite Stiefel Manifolds  $U(p, q; \mathbb{F})/U(p - m, q; \mathbb{F})$* , Memoirs of the Amer. Math. Soc. **462**, 1992.
- [81] with T. Oshima, *Lie Groups and Representations*, Iwanami, 2005, 610 pp. (Japanese)
- [82] with A. Borel and L. Ji, *Lie Theory: Unitary Representations and Compactifications of Symmetric Spaces* (J.-P. Anker and B. Ørsted, eds.), Progress in Mathematics **229**, Birkhäuser, 2005.

## Course Lectures (recent ones)

1. Summer School organized by Shing-Tung Yau (chair) et al. (course lectures), *Clifford-Klein Forms of Non-Riemannian Homogeneous Spaces*, 2006, China.
2. Summer School organized by Joachim Hilgert and Tilmann Wurzbacher (course lectures), *Unitary Representations, Restrictions, and their Applications*, 2006, Germany.
3. Graduate course at the University of Tokyo, *Topics on Unitary Representation Theory by Complex Analytic Methods*, 2006, Japan.
4. Graduate course at Hiroshima University, *Group Actions and Representations of Lie Groups*, 2006, Japan.
5. Summer School (course lectures), Tambara, *Visible Actions and Multiplicity-Free Representations*, 2005, Japan.
6. Graduate course at Osaka City University, *Visible Actions and Multiplicity-Free Representations*, 2005, Japan.
7. Graduate course at the University of Tokyo, *Visible Actions and Multiplicity-Free Representations*, 2004, Japan.
8. Graduate course at Tokyo Institute of Technology, *Discontinuous Groups on non-Riemannian Homogeneous Spaces*, 2003, Japan.
9. Graduate course at the University of Tokyo, *Restriction of Unitary Representations*, 2002, Japan.
10. Winter School on Geometry and Physics (course lectures), *Conformal Geometry and Analysis on Minimal Representations*, 2002, Czech Republic.
11. Graduate course at the University of Tokyo, *Multiplicity One Theorem of Branching Laws*, 2001, Japan.
12. Graduate course at Harvard University (25 lectures), *Restriction of Representations to Reductive Subgroups*, 2000-2001, USA.
13. European School on Group Theory (course lectures), *Branching Problems and Unitary Representations*, 2000, Denmark.
14. Graduate course at the University of Tokyo, *Lie Groups and Lie Algebras*, 2000, Japan.
15. Graduate course at the University of Tokyo, *Discontinuous Groups for Homogeneous Spaces*, 2000, Japan.
16. Graduate course at the University of Tokyo, *Conformal Geometry and Global Solutions to Yamabe Equations*, 1999-2000, Japan.
17. Graduate course at Hokkaido University, *Geometric Structures on Homogeneous Spaces and Discontinuous Groups*, 1999, Japan.
18. Graduate course at Nagoya University, *Multiplicity Free Branching Laws for Unitary Highest Weight Modules*, 1999, Japan.
19. Summer School (course lectures), Yonsei University, *Restriction Theory of Unitary Representations*, 1999, Korea.

## **Ph.D. students and postdoc students of T. Kobayashi**

### **Former Ph.D. and master students**

Gen Mano, RIMS, Kyoto University, Ph.D. 2007  
Taro Yoshino, University of Tokyo, Ph.D. 2005  
Salma Nasrin, University of Tokyo, Ph.D. 2003  
Yukio Koriyama, University of Tokyo, M.A. 2002  
Taro Yoshino, University of Tokyo, M.A. 2002  
Gen Mano, University of Tokyo, M.A. 2002  
Katsuki Tezuka, University of Tokyo, M.A. 2002  
Hidehisa Alikawa, University of Tokyo, M.A. 2001  
Salma Nasrin, University of Tokyo, M.A. 2000

### **Former and Current postdoc students**

Gen Mano (Japan), 2007–2008  
Taro Yoshino (Japan), 2005–2007; 2007–2010  
Salma Nasrin (Bangladesh), 2003–2005  
Andreas Nilsson (Sweden), 1999–2001, 2005  
Tibor Odor (Hungary), 1999–2001

## **International Conference (co)organized by T. Kobayashi**

*Harmonische Analysis und Darstellungstheorie Topologischer Gruppen*,  
Oberwolfach, Germany, 2007,  
coorganized with Bernhard Krötz, Erez Lapid, and Charles Torossian.  
*2nd Takagi Lectures*, Tokyo, Japan, 2007,  
coorganized with Y. Kawahigashi, H. Nakajima, K. Ono and T. Saito.  
*1st Takagi Lectures*, Kyoto, Japan, 2006,  
coorganized with Y. Kawahigashi, H. Nakajima, K. Ono and T. Saito.  
*Representation Theory and Automorphic Forms*, Seoul, Korea, 2005,  
coorganized with W. Schmid (USA) and J. Yang (Korea).  
*Representation Theory*, Awajishima island, Japan, 2004,  
coorganized with H. Ochiai and H. Tagawa.  
*Analysis on Homogeneous Spaces and Representation Theory*, Okayama, Japan, 1997,  
coorganized with M. Kashiwara, T. Oshima and K. Nishiyama.

## **Weekly Seminar held by T. Kobayashi**

Speakers in the last 4 years include:

Oksana Yakimova (Germany), Sai Kee Yeung (USA), Pierre Pansu (France), Katsuhiko Kikuchi (Japan), Sigurdur Helgason (USA), Gestur Ólafsson (USA), Anthony Dooley (Australia), Hidenori Fujiwara (Japan), Hubert Rubenthaler (France), Dan Barbasch (USA), Michel Duflo (France), Birgit Speh (USA), Toshihiko Matsuki (Japan), Jacques Faraut (France), Leticia Barchini (USA), H.-Y. Loke (Singapore), Bernhard Krötz (Germany), Troels Johansen (Germany), Alexander Alldridge (Germany), Eric Opdam (the Netherlands), Misha Pevzner (France), Adam Koranyi (USA), Herbert Heyer (Germany), Munibur R. Chowdhury (Bangladesh), Eric Sommers (USA), Raphael Rouquier (France), Soo Teck Lee (Singapore), Kyo Nishiyama (Japan), Hisayosi Matumoto (Japan), Andreas Nilsson (Sweden), Genkai Zhang (Sweden), Pavle Pandzic (Croatia), Peter E. Trapa (USA), Jorge Vargas (Argentina), Christof Geiss (Mexico), Yurii Neretin (Russia), Gerrit van Dijk (the Netherlands).

## Complete List of Publications

- [1] T. Kobayashi, *The null variety of the Fourier–Laplace transform of the characteristic function of a bounded domain*, Seminar Reports of Unitary Representation **6** (1986), 1–18 (in Japanese), at the annual conference on unitary representation theory at Toba (organized by K. Kumahara).
- [2] ———, *The null variety of the Fourier transform of the characteristic function of a convex domain*, Master Dissertation I, the University of Tokyo, 1987, 98 pp.
- [3] ———, *Discrete series representation for vector bundles over semisimple symmetric spaces*, Master Dissertation II, the University of Tokyo, 1987, 56 pp.
- [4] ———, *Construction of discrete series for vector bundles over semisimple symmetric spaces*, Characteristic Function on a Symmetric Space and Representation of Lie Group (K. Minemura, ed.), Surikaiseki Kokyuroku, RIMS, vol. 642, 1988, pp. 134–156.
- [5] T. Kobayashi and K. Ono, *Note on Hirzebruch’s proportionality principle*, Representation Theory and its Applications to Physics (Y. Kanie, ed.), Surikaiseki Kokyuroku, RIMS, vol. 700, 1989, pp. 103–126.
- [6] T. Kobayashi, *Properly discontinuous actions on reductive homogeneous spaces*, Seminar Reports of Unitary Representation **8** (1988), 17–22 (in Japanese), at the annual conference on unitary representation theory at Lake-Kawaguchi (organized by H. Yamada), November 1988.
- [7] T. Kobayashi, K. Ono, and T. Sunada, *Periodic Schrödinger operators on a manifold*, Forum Math. **1** (1989), no. 1, 69–79.
- [8] T. Kobayashi, *Asymptotic behaviours of the null variety for a convex domain in a non-positively curved space form*, Jour. Fac. Sci. Univ. Tokyo **36** (1989), no. 3, 389–478.
- [9] ———, *Proper action on a homogeneous space of reductive type*, Math. Ann. **285** (1989), no. 2, 249–263.
- [10] ———, *How can we VIEW from silhouettes?*, Sugaku Seminar **9** (1989), 82–87 (in Japanese), reproduced in “Gendai Sugaku no Ayumi 4”.
- [11] ———, *Unitary representations realized in  $L^2$ -sections of vector bundles over semisimple symmetric spaces*, Proceedings of the Joint Symposium of Real Analysis and Functional Analysis (cosponsored by the Mathematical Society of Japan), 1989, pp. 39–54 (in Japanese).
- [12] ———, *Homogeneous spaces with indefinite-metric and discontinuous groups*, 36th Geometry Symposium, 1989, pp. 104–116 (in Japanese).
- [13] ———, *Proper action on a homogeneous space of reductive type*, Ph.D. thesis, the University of Tokyo, 1990.
- [14] ———, *Discontinuous groups acting on non-Riemannian homogeneous spaces*, Workshop on Algebraic Groups and Related Topics (I. Satake, ed.), Surikaiseki Kokyuroku, RIMS, vol. 737, 1990, pp. 6–29.

- [15] T. Kobayashi and K. Ono, *Note on Hirzebruch's proportionality principle*, Jour. Fac. Sci. Univ. Tokyo **37** (1990), no. 1, 71–87.
- [16] T. Kobayashi, *Discontinuous group in a homogeneous space of reductive type*, Seminar Reports of Unitary Representation **10** (1990), 41–45, at the International Conference on Representation Theories of Lie Groups and Lie Algebras at Lake-Kawaguchi.
- [17] ———, *Some examples of the branching rule of unitary representations associated to isomorphisms of homogeneous spaces*, unpublished notes, 1990.
- [18] ———, *Singular unitary representations and discrete series for the indefinite Stiefel manifolds  $U(p, q; \mathbb{F})/U(p - m, q; \mathbb{F})$* , abstracts of a Conference held in Sandbjerg Gods', August 26–30, 1991, edited by N. V. Pedersen, Mathematical Institute, Copenhagen University, Report, vol. 3, 1991, pp. 30–33.
- [19] ———, *Singular unitary representations and discrete series for indefinite Stiefel manifolds  $U(p, q; \mathbb{F})/U(p - m, q; \mathbb{F})$* , Mem. Amer. Math. Soc., vol. 462, Amer. Math. Soc., 1992, 106 pp. ISBN 0-8128-2524-0.
- [20] ———, *Discontinuous groups acting on homogeneous spaces of reductive type*, Proceedings of Representation Theory of Lie Groups and Lie Algebras, Fuji-Kawaguchiko, 1990 (T. Kawazoe, T. Oshima, and S. Sano, eds.), World Scientific, 1992, pp. 59–75, ISBN 9810210906.
- [21] ———, *A necessary condition for the existence of compact Clifford–Klein forms of homogeneous spaces of reductive type*, Duke Math. J. **67** (1992), 653–664.
- [22] ———, *Convex domains and Fourier transform on spaces of constant curvature*, Lecture Notes of the UNESCO–CIMPA School on “Invariant differential operators on Lie groups and homogeneous spaces”, at WuHan University in P. R. China, 1991 (P. Torasso, ed.), 1991, 112 pp.
- [23] ———, *Perturbations of domains in the Pompeiu problem*, Comm. Anal. Geom. **1** (1993), 29–55.
- [24] ———, *The restriction of  $A_q(\lambda)$  to reductive subgroups*, Proc. Japan Acad. Ser. A **69** (1993), 262–267.
- [25] ———, *On discontinuous groups acting on homogeneous spaces with noncompact isotropy subgroups*, J. Geom. Physics **12** (1993), 133–144.
- [26] ———, *Bounded domains and the zero sets of Fourier transforms*, 75 Years of Radon Transform (S. Gindikin and P. Michor, eds.), International Press, Hongkong, 1994, pp. 223–239, Conference Proceedings and Lecture Notes in Mathematical Physics, **IV**. ISBN 157146008X.
- [27] ———, *Harmonic analysis on homogeneous spaces of reductive type and representation theory*, Sugaku **46** (1994), 124–143 (in Japanese).
- [28] ———, *Discrete decomposability of the restriction of  $A_q(\lambda)$  with respect to reductive subgroups and its applications*, Invent. Math. **117** (1994), 181–205.

- [29] ———, *Discontinuous groups acting on homogeneous spaces—Calabi–Markus phenomenon, compact Clifford–Klein forms*, Lecture notes of European School on Group Theory held at Sandbjerg Gods’, August 15–26, 1994 (1994), 30 pp.
- [30] ———, *Integral geometry for submanifolds and Plancherel formulas of complex homogeneous manifolds*, Proceedings on the Symposium on Representation Theory at Toyama (November 16–19, 1994), 1994, pp. 16–25 (in Japanese).
- [31] ———, *The restriction of  $A_q(\lambda)$  to reductive subgroups II*, Proc. Japan Acad. Ser. A **71** (1995), 24–26.
- [32] ———, *Introduction to harmonic analysis on spherical homogeneous spaces*, Proceedings of 3rd Summer School on Number Theory “Homogeneous Spaces and Automorphic Forms” held at Rikkyo University, January 1995 and at Yamagata-mura in Nagano, July 1995 (F. Sato, ed.), 1995, pp. 22–41 (in Japanese).
- [33] ———, *Criterion for proper actions on homogeneous spaces of reductive groups*, J. Lie Theory **6** (1996), no. 2, 147–163.
- [34] ———, *Discontinuous groups and Clifford–Klein forms of pseudo-Riemannian homogeneous manifolds*, Algebraic and Analytic Methods in Representation Theory (H. Schlichtkrull and B. Ørsted, eds.), Perspectives in Mathematics, vol. 17, Academic Press, 1996, pp. 99–165, ISBN 0-12-625440-0.
- [35] ———, *A vanishing theorem of modular symbols on locally symmetric varieties*, (notes taken by S. Ishikawa), Proceedings of Representation Theory and Related Topics, Kurashiki 1996 (N. Shimeno, ed.), 1996, pp. 1–16 (in Japanese).
- [36] T. Kobayashi and T. Oshima, *Multiplicities of induced representations of semisimple Lie groups*, unpublished notes, 1996.
- [37] T. Kobayashi, *On the restriction of unitary representations and their applications*, Proceedings of Symposium on Representation Theory, Mikawa, 1996, pp. 131–141 (in Japanese).
- [38] ———, *Monastir Seminar on the restriction of unitary representations and their applications*, Proceedings of the CIMPA School, held in Tunisia, July–August 1996 (P. Torasso, ed.), 1997.
- [39] ———, *Monastir Seminar on proper actions, discontinuous groups, and uniform lattices for pseudo-Riemannian homogeneous manifolds*, Proceedings of the CIMPA School, held in Tunisia, July–August 1996 (P. Torasso, ed.), 1997.
- [40] ———,  *$L^p$ -analysis on homogeneous manifolds of reductive type and representation theory*, Proc. Japan Acad. **73** (1997), 62–66.
- [41] ———, *Multiplicity free theorem in branching problems of unitary highest weight modules*, Proceedings of Representation Theory held at Saga, Kyushu, 1997 (K. Mimachi, ed.), 1997, pp. 9–17.
- [42] ———, *Invariant measures on homogeneous manifolds of reductive type*, J. Reine Angew. Math. **490** (1997), 37–53.



- [43] ———, *Discrete and continuous—Branching laws of infinite dimensional representations and their applications*, Proceedings of plenary lectures, the Mathematical Society of Japan, held at Meijo University, March, 1998, 1998, pp. 35–54 (in Japanese).
- [44] ———, *Harmonic analysis on homogeneous manifolds of reductive type and unitary representation theory*, Translations, Series II, Selected Papers on Harmonic Analysis, Groups, and Invariants (K. Nomizu, ed.), vol. 183, Amer. Math. Soc., 1998, pp. 1–31, ISBN 0-8218-0840-0.
- [45] ———, *Discrete series representations for the orbit spaces arising from two involutions of real reductive Lie groups*, J. Funct. Anal. **152** (1998), 100–135.
- [46] ———, *Discrete decomposability of the restriction of  $A_q(\lambda)$  with respect to reductive subgroups II—micro-local analysis and asymptotic  $K$ -support*, Annals of Math. **147** (1998), no. 3, 709–729.
- [47] T. Kobayashi and T. Oda, *A vanishing theorem for modular symbols on locally symmetric spaces*, Comment. Math. Helv. **73** (1998), 45–70.
- [48] T. Kobayashi, *Discrete decomposability of the restriction of  $A_q(\lambda)$  with respect to reductive subgroups III—restriction of Harish-Chandra modules and associated varieties*, Invent. Math. **131** (1998), 229–256.
- [49] T. Kobayashi and B. Ørsted, *Conformal geometry and branching laws for unitary representations attached to minimal nilpotent orbits*, C. R. Acad. Sci. Paris **326** (1998), 925–930.
- [50] T. Kobayashi, *Deformation of compact Clifford–Klein forms of indefinite-Riemannian homogeneous manifolds*, Math. Ann. **310** (1998), no. 3, 395–409.
- [51] ———, *Theory of discretely decomposable restrictions of unitary representations and its development*, Proceedings of Plenary Lectures of the Mathematical Society of Japan, held at Gakushuin University, Tokyo, March, 1999, 1999, pp. 1–19 (in Japanese).
- [52] ———, *Theory of discretely decomposable restrictions of unitary representations of semisimple Lie groups and its developments*, Sugaku **51** (1999), no. 4, 337–356 (in Japanese), an English translation.
- [53] ———, *Adjoint action*, Encyclopaedia of Mathematics, Kluwer Academic Publishers, 1999, pp. 15–16.
- [54] ———, *Discontinuous groups for homogeneous spaces*, Symposium on Representation Theory, at Tateyama (H. Matumoto, ed.), 1999, pp. 99–110 (in Japanese).
- [55] T. Kobayashi and T. Oshima, *Lie groups and Lie algebras I*, Iwanami, 1999 (in Japanese), xvi+293 pp. Reproduced in “Lie Groups and Representations”, Iwanami, 2005.
- [56] T. Kobayashi, *Lie groups and Lie algebras II*, Iwanami, 1999 (in Japanese), xix+314 pp. Reproduced in “Lie Groups and Representations”, Iwanami, 2005.

- [57] ———, *Multiplicity-free restrictions of unitary highest weight modules for reductive symmetric pairs*, preprint UTMS 2000–1.
- [58] ———, *Discretely decomposable restrictions of unitary representations of reductive Lie groups—examples and conjectures*, Advanced Study in Pure Mathematics, Analysis on Homogeneous Spaces and Representation Theory of Lie Groups, Okayama–Kyoto (T. Kobayashi, M. Kashiwara, T. Matsuki, K. Nishiyama, and T. Oshima, eds.), vol. 26, 2000, pp. 98–126.
- [59] ———, *Branching laws of unitary highest weight modules with respect to semisimple symmetric pairs*, Tangunsbericht, Representation Theory and Complex Analysis **18** (2000), 15–16.
- [60] T. Kobayashi, M. Kashiwara, T. Matsuki, K. Nishiyama, and T. Oshima (eds.), *Analysis on homogeneous spaces and representation theory of Lie groups, Okayama–Kyoto*, Adv. Stud. Pure Math., vol. 26, Mathematical Society of Japan, 2000, 359 pp. ISBN 4-314-10138-5.
- [61] T. Kobayashi, *Discontinuous groups for non-Riemannian homogeneous spaces*, Mathematics Unlimited—2001 and Beyond (B. Engquist and W. Schmid, eds.), Springer-Verlag, 2001, pp. 723–747, ISBN 3540669132.
- [62] ———, *Book review on “Continuous groups”, L. S. Pontryagin*, Sugaku no Tanoshimi, vol. 23, Nippon-Hyoron-Sha, 2001, pp. 110–119 (in Japanese).
- [63] ———, *Branching problems of unitary representations*, Proc. of ICM 2002, Beijing, vol. 2, 2002, pp. 615–627, math.RT/0304326.
- [64] ———, *Discontinuous groups for non-Riemannian homogeneous spaces (translation from English)*, Sugaku no Saisentan, challenge to the 21th century, vol. 1, Springer-Verlag, Tokyo, 2002, pp. 18–73 (in Japanese).
- [65] ———, *Introduction to actions of discrete groups on pseudo-Riemannian homogeneous manifolds*, Acta Appl. Math. **73** (2002), 115–131.
- [66] ———, *Various prompts—when I started studying mathematics*, Sugaku no Tanoshimi, vol. 29, Nippon-Hyoron-Sha, 2002, pp. 9–19, Reproduced in “Sugaku Manabi Hajime”, vol. 2, Nippon-Hyoron-Sha, 2006. (in Japanese).
- [67] ———, *On the canonical inner product on the space of global solutions of the Yamabe operator*, Proceedings of Differential Geometry Symposium on “Various Geometric Structures”, 2002, pp. 4–5.
- [68] ———, *The canonical inner product on the space of solutions of the Yamabe operator*, Representations of Noncommutative Algebraic Systems and Harmonic Analysis (T. Ohta, ed.), Surikaiseki Kokyuroku, RIMS, vol. 1294, 2002, pp. 76–86 (in Japanese).
- [69] ———, *Branching problems of unitary representations*, Proceedings of Symposium of Representation Theory, held at Fuji Haitsu, November 2002 (S. Sano, ed.), 2002, pp. 39–52.

- [70] T. Kobayashi and B. Ørsted, *Analysis on the minimal representations of  $O(p, q)$ , I.—Realization and conformal geometry*, Adv. Math. **180** (2003), 486–512, math.RT/0111083.
- [71] ———, *Analysis on the minimal representations of  $O(p, q)$ , II.—Branching laws*, Adv. Math. **180** (2003), 513–550, math.RT/0111085.
- [72] ———, *Analysis on the minimal representations of  $O(p, q)$ , III.—Ultra-hyperbolic equations on  $\mathbb{R}^{p-1, q-1}$* , Adv. Math. **180** (2003), 551–595, math.RT/0111086.
- [73] T. Kobayashi, *Conformal geometry and global solutions to the Yamabe equations on classical pseudo-Riemannian manifolds*, Supplemento di Rendiconti del Circolo Matematico di Palermo, Serie II **71** (2003), 15–40, Lecture Notes of the 22nd Winter School 2002 on Geometry and Physics, Czech Republic.
- [74] T. Kobayashi and S. Nasrin, *Multiplicity one theorem in the orbit method*, Amer. Math. Soc. Transl., Advances in the Mathematical Sciences, Series 2 **210** (2003), 161–169, Special volume in memory of Professor F. Karpelevič.
- [75] T. Kobayashi, *Schrödinger model of the minimal representation of  $O(p, q)$* , Automorphic Forms on Type IV Symmetric Domains (T. Oda, ed.), Surikaiseki Kokyuroku, RIMS, vol. 1342, 2003, pp. 107–116 (in Japanese).
- [76] ———, *Multiplicity one theorem on branching laws and geometry of complex manifolds*, Expansion of Lie Theory and New Advances (S. Ariki, ed.), Surikaiseki Kokyuroku, RIMS, vol. 1348, 2003, pp. 1–9 (in Japanese).
- [77] T. Kobayashi and A. Nilsson, *Characterizing multipliers by relative invariance*, Expansion of Lie Theory and New Advances (S. Ariki, ed.), Surikaiseki Kokyuroku, RIMS, vol. 1348, 2003, pp. 10–22.
- [78] T. Kobayashi, *On discontinuous groups for non-Riemannian homogeneous spaces*, Proceedings of Geometry Session, the Mathematical Society of Japan, September 2003, 2003, pp. 75–89.
- [79] ———, *Geometry of multiplicity-free representations of  $GL(n)$ , visible actions on flag varieties, and triunity*, Acta Appl. Math. **81** (2004), 129–146.
- [80] T. Kobayashi, H. Ochiai, and H. Tagawa (eds.), *Symposium on Representation theory 2004, Awajishima*, 2004, 164 pp., ISBN 4-9902328-0-1.
- [81] T. Kobayashi and G. Mano, *Integral formulas for the minimal representations for  $O(p, 2)$* , Acta Appl. Math. **86** (2005), 103–113.
- [82] T. Kobayashi and T. Oshima, *Lie groups and representations*, Iwanami, 2005 (in Japanese), 610 pp.
- [83] T. Kobayashi, *Restrictions of unitary representations of real reductive groups*, Lie Theory: Unitary Representations and Compactifications of Symmetric Spaces (J.-P. Anker and B. Ørsted, eds.), Progress in Mathematics **229**, Birkhäuser, 2005, pp. 139–207, ISBN 0817635262.

- [84] ———, *Multiplicity-free representations and visible actions on complex manifolds*, Publ. Res. Inst. Math. Sci. **41** (2005), 497–549, special issue commemorating the fortieth anniversary of the founding of RIMS.
- [85] ———, *Theory of discrete decomposable branching laws of unitary representations of semisimple Lie groups and some applications*, Sugaku Expositions **18** (2005), 1–37, a translation of the original article in Japanese.
- [86] ———, *On discontinuous group actions on non-Riemannian homogeneous spaces*, Sugaku **57** (2005), 267–281 (in Japanese), An English translation is to appear from Amer. Math. Soc.
- [87] T. Kobayashi and T. Yoshino, *Compact Clifford–Klein forms of symmetric spaces—revisited*, Pure and Appl. Math. Quarterly **1** (2005), 603–684, Special Issue: In Memory of Armand Borel. math.DG/0509543.
- [88] T. Kobayashi and G. Mano, *The minimal representation of  $O(p, 2)$  and an integral formula for the inversion operator*, Representation Theory and Harmonic Analysis on Homogeneous Spaces (J. Inoue, ed.), Surikaiseki Kokyuroku, RIMS, vol. 1410, 2005, pp. 173–187 (in Japanese).
- [89] T. Kobayashi, *Fourier transform of a minimal  $K$ -type vector in the minimal representation of  $O(p + 1, q + 1)$* , Automorphic Forms on  $Sp(2, \mathbb{R})$  and  $SU(2, 2)$ , III (T. Oda, ed.), Surikaiseki Kokyuroku, RIMS, vol. 1421, 2005, pp. 1–11 (in Japanese).
- [90] T. Kobayashi and A. Nilsson, *Invariant multipliers and  $O(p, q)$ -action*, Proceedings of Symposium on Representation Theory 2005, held at Kakegawa, November 15–18, 2005 (S. Aoki, S. Kato, and H. Oda, eds.), 2005, pp. 10–21.
- [91] T. Kobayashi, *Multiplicity-free representations and visible actions on complex manifolds*, Proceedings of Symposium on Representation Theory 2005, held at Kakegawa, November 15–18, 2005 (S. Aoki, S. Kato, and H. Oda, eds.), 2005, pp. 33–66.
- [92] T. Kobayashi and G. Mano, *The inversion operator for the minimal representation of  $O(p, q)$* , Representation Theory of Groups and Extension of Harmonic Analysis (T. Kawazoe, ed.), Surikaiseki Kokyuroku, RIMS, vol. 1467, 2006, pp. 51–61 (in Japanese).
- [93] T. Kobayashi and S. Nasrin, *Deformation space of discontinuous groups  $\mathbb{Z}^k$  for a nilmanifold  $\mathbb{R}^{k+1}$* , Representation Theory of Groups and Extension of Harmonic Analysis (T. Kawazoe, ed.), Surikaiseki Kokyuroku, RIMS, vol. 1467, 2006, pp. 101–111.
- [94] T. Kobayashi, *Various prompts*, Sugaku Manabi Hajime [When I Started Studying Mathematics], vol. 2, Nippon-Hyoron-Sha, 2006, pp. 198–221, ISBN 4-535-78516-3 (in Japanese).
- [95] ———, *Introduction to visible actions on complex manifolds and multiplicity-free representations*, Developments of Cartan Geometry and Related Mathematical Problems (T. Morimoto, ed.), Surikaiseki Kokyuroku, RIMS, vol. 1502, 2006, pp. 82–95.

- [96] ———, *Multiplicity-free representations and visible actions on complex manifolds*, Proceedings of The 53rd Geometry Symposium (edited by Kenji Fukaya), 2006, pp. 119–133 (in Japanese).
- [97] Y. Kawahigashi, T. Kobayashi, H. Nakajima, K. Ono, and T. Saito (eds.), *The first Takagi Lectures*, 2006.
- [98] T. Kobayashi and S. Nasrin, *Deformation of properly discontinuous actions of  $\mathbb{Z}^k$  on  $\mathbb{R}^{k+1}$* , Internat. J. Math. **17** (2006), no. 10, 1175–1193, math.DG/0603318.
- [99] T. Kobayashi, *On the establishment of the Takagi Lectures*, Japan. J. Math. **2** (2007), no. 1, 145–148.
- [100] T. Kobayashi and G. Mano, *Integral formula of the unitary inversion operator for the minimal representation of  $O(p, q)$* , Proc. Japan Acad. Ser. A **83** (2007), no. 3, 27–31.
- [101] T. Kobayashi, *On the establishment of the Takagi Lectures*, Sugaku Seminar **6** (2007), no. 549, 50–51 (in Japanese).
- [102] ———, *Discoveries at the age of twenty-five, and mathematics expanding beyond oneself*, Japanese Scientific Monthly **60** (2007), no. 5, 311–313 (in Japanese).
- [103] ———, *On the Takagi Lectures*, Sugaku Tsushin **12** (2007), no. 1, 49–51 (in Japanese).
- [104] Y. Kawahigashi, T. Kobayashi, H. Nakajima, K. Ono, and T. Saito (eds.), *The second Takagi Lectures*, 2007.
- [105] T. Kobayashi, *A generalized Cartan decomposition for the double coset space  $(U(n_1) \times U(n_2) \times U(n_3)) \backslash U(n) / (U(p) \times U(q))$* , Journal of Mathematical Society of Japan **59** (2007), no. 3, 669–691, math.RT/0607006.
- [106] T. Kobayashi and G. Mano, *The inversion formula and holomorphic extension of the minimal representation of the conformal group*, Harmonic Analysis, Group Representations, Automorphic Forms and Invariant Theory: In Honour of Roger E. Howe (Jian-Shu Li, Eng-Chye Tan, Nolan Wallach, and Chen-Bo Zhu, eds.), Singapore University Press and World Scientific Publishing, 2007, pp. 159–223, ISBN 978-9812770783. math.RT/0607007.
- [107] T. Kobayashi, *Multiplicity-free theorems of the restrictions of unitary highest weight modules with respect to reductive symmetric pairs*, Representation Theory and Automorphic Forms, Progr. Math., vol. 255, Birkhäuser, 2007, pp. 45–109, math.RT/0607002.
- [108] T. Kobayashi, W. Schmid, and J.-H. Yang (eds.), *Representation theory and automorphic forms*, Progr. Math., vol. 255, Birkhäuser, 2007, ISBN 0817645055.
- [109] T. Kobayashi, *Sozoryoku no gensen, sugaku [mathematics—a source of creativity]*, Kyoyo-gakubu-ho, University of Tokyo (2007), no. 506, 2 (in Japanese).
- [110] Y. Kawahigashi, T. Kobayashi, H. Nakajima, K. Ono, and T. Saito (eds.), *The third Takagi Lectures*, 2007.

- [111] T. Kobayashi, *Preface*, The Third Takagi Lectures (Y. Kawahigashi, T. Kobayashi, H. Nakajima, K. Ono, and T. Saito, eds.), 2007, pp. i–iii.
- [112] ———, *Visible actions on symmetric spaces*, Transformation Groups **12** (2007), no. 4, 671–694, math.DG/0607005.
- [113] ———, *On discontinuous group actions on non-Riemannian homogeneous spaces*, RIMS Preprint–1536 (March 2006), to appear in Sugaku Expositions, Amer. Math. Soc.; a translation of the original article in Japanese. 29 pp. math.DG/0603319.
- [114] ———, *Propagation of multiplicity-free property for holomorphic vector bundles*, preprint. 27 pp. math.RT/0607004.
- [115] T. Kobayashi and A. Nilsson, *Group invariance and  $L^p$ -bounded operators*, to appear in Math. Z. 29 pp.
- [116] T. Kobayashi, *Rigidity and deformation of discontinuous groups for non-Riemannian symmetric spaces* (in Japanese), preprint. To appear in RIMS Kokyuroku Bessatsu, Representation Theory and Analysis on Homogeneous Spaces (H. Sekiguchi, ed.), 12 pp.
- [117] T. Kobayashi and A. Nilsson, *Indefinite higher Riesz transforms*, preprint. To appear in Arkiv for Matematik. 16 pp.
- [118] T. Kobayashi and G. Mano, *The Schrödinger model for the minimal representation of the indefinite orthogonal group  $O(p, q)$* , preprint. 167 pp. arXiv:0712.1769v1 [math.RT].

## Complete List of Invited Lectures

- [1] *On the Null Variety of the Fourier–Laplace Transform of the Characteristic Function of a Domain.* Symposium on Unitary Representation Theory. Toba, Japan, 20–22 November 1986.
- [2] *On the Null Variety of the Fourier–Laplace Transform of the Characteristic Function of a Domain.* colloquium. the University of Tokyo, Japan, May 1987.
- [3] *On Discrete Series for Vector Bundles over Semisimple Symmetric Spaces.* Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, May 1987.
- [4] *On the Null Variety of the Fourier–Laplace Transform of the Characteristic Function of a Domain.* seminar. Tokyo Institute of Technology, Japan, June 1987.
- [5] *Construction of Discrete Series for Vector Bundles over Semisimple Symmetric Spaces.* Workshop on Eigenspaces on Symmetric Spaces and Representations of Lie Groups. RIMS, Kyoto University, Japan, 27–30 July 1987.
- [6] *Note on Hirzebruch’s Proportionality Principle.* Workshop on Representation Theory and its Application to Physics. RIMS, Kyoto University, Japan, 18–21 July 1988. (with Kaoru Ono).
- [7] *Properly Discontinuous Actions on Homogeneous Spaces of Reductive Type.* Symposium on Unitary Representation Theory. Kawaguchiko, Japan, 19–22 November 1988.
- [8] *On Uniform Lattice for an Pseudo-Riemannian Homogeneous Space.* lecture on Lie Groups. Okayama University of Science, Japan, 15–16 December 1988.
- [9] *Towards Harmonic Analysis on a (Non-symmetric) Homogeneous Space of Reductive Type.* Symposium on Fields of Functional Analysis and their Developments (on the occasion of Professor I. M. Gel’fand’s visit to Japan). RIMS, Kyoto University, Japan, 24 March 1989.
- [10] *Properly Discontinuous Actions on Homogeneous Spaces of Reductive Type.* Annual Meeting of the Mathematical Society of Japan. Nihon University, Japan, April 1989.
- [11] *A Remark on Hirzebruch’s Proportionality Principle.* Annual Meeting of the Mathematical Society of Japan. Nihon University, Japan, April 1989. (with Kaoru Ono).
- [12] *How Can We VIEW From Silhouettes?* Relay Lecture at the May Festival. the University of Tokyo, Japan, May 1989.
- [13] *Unitary Representations Realized as Sections for Vector Bundles over Semisimple Symmetric Spaces.* Joint Symposium on Real Analysis and Functional Analysis. Hirosaki University, Japan, 20–22 July 1989.
- [14] *Homogeneous Spaces with Indefinite Metric and their Discontinuous Groups.* Geometry Symposium. Tohoku University, Japan, August 1989.

- [15] *Analysis on Homogeneous Vector Bundles and Unitary Representations of Semisimple Lie Groups.* (invited address at Functional Analysis Session), Annual Meeting of the Mathematical Society of Japan. Sophia University, Japan, September 1989.
- [16] *Discontinuous Groups for Homogeneous Spaces.* Friday Colloquium. the University of Tokyo, Japan, 20 October 1989.
- [17] *New Examples of Branching Laws of Infinite Dimensional Representations That Arise from Isomorphisms of Homogeneous Spaces.* Seminar on Lie Groups and Representation Theory. the University of Tokyo, Japan, 16 November 1989.
- [18] *New Examples of Branching Laws of Infinite Dimensional Representations That Arise from Isomorphisms of Homogeneous Spaces.* Second Workshop on Representation of Lie Groups. Tottori University, Japan, 8–10 January 1990.
- [19] *Criterion of the Vanishing of a Certain Family of  $(\mathfrak{g}, K)$ -modules.* Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, 8 March 1990.
- [20] *Properly Discontinuous Group in a Non-Riemannian Homogeneous Space.* RIMS, Kyoto University, Japan, 28–31 May 1990.
- [21] *Discontinuous Group in a Homogeneous Space of Reductive Type.* (opening lecture), International Conference on Representation Theories of Lie Groups and Lie Algebras. Kawaguchi, Japan, 30 August–3 September 1990.
- [22] *The Non-vanishing Condition of Certain Family of Cohomologically Induced  $(\mathfrak{g}, K)$ -modules.* special colloquium. Kyoto University, Japan, 16 November 1990.
- [23] *A Necessary Condition for the Existence of a Uniform Lattice for Homogeneous Spaces of Reductive Type.* Seminar on Lie Groups and Representation Theory. the University of Tokyo, Japan, 22 December 1990.
- [24] *On the Structure of the Group Consisting of Elliptic Elements.* Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, 26 January 1991.
- [25] *On Discontinuous Groups Acting on Homogeneous Spaces of Reductive Type.* colloquium. the University of Tokyo, Japan, 11 April 1991.
- [26] *Convex Domains and Fourier Transform on a Space of Constant Curvature.* (12 lectures), Spring school on Invariant Differential Operators on Lie Groups and Homogeneous Spaces (CIMPA-UNESCO School cosponsored by China and the France Mathematics Centre). Wuhan University, China, 21 April–11 May 1991.
- [27] *Singular Unitary Representations and Discrete Series for Indefinite Stiefel Manifolds  $U(p, q; \mathbb{F})/U(p - m, q; \mathbb{F})$ .* Conference at Sandbjerg Estate on Harmonic Analysis on Lie groups. Denmark, August 1991.
- [28] *Actions on Discrete Groups on Symmetric Spaces.* seminar on Lie groups (Odense, Roskilde, Royal Veterinary and Agricultural Universities). Roskilde University, Denmark, 5 September 1991.
- [29] *Proper Actions on Non-Riemannian Homogeneous Spaces.* Institute for Advanced Study, Princeton, USA, 4 November 1991.



- [30] *Discontinuous Groups Acting on Pseudo-Riemannian Homogeneous Spaces*. colloquium. Columbia University, USA, 15 January 1992.
- [31] *Discontinuous Groups Acting on Homogeneous Spaces of Reductive Type*. seminar on Lie Groups. University of Maryland, USA, 2 April 1992.
- [32] *Actions of Discrete Groups on Homogeneous Spaces of Reductive Type*. colloquium. State University of New York at Stony Brook, USA, 9 April 1992.
- [33] *Discontinuous Groups Acting on Homogeneous Spaces with Noncompact Isotropy Subgroups*. Special Geometry Seminar. State University of Pennsylvania, USA, April 1992.
- [34] *Bounded Domains and the Zero Sets of Fourier Transform*. Workshop on Integral Geometry on Homogeneous Manifolds (in Conference “75 years of Radon transform”). University of Vienna, Austria, September 1992.
- [35] *Some Features in Harmonic Analysis on Non-symmetric Homogeneous Spaces and Unitary Representations of Semisimple Lie Groups*. Conference on Fourier and Radon Transformations on Symmetric Spaces, in honor of Prof. S. Helgason’s 65th birthday. Roskilde University, Denmark, September 1992.
- [36] *Some Topics in Integral Geometry Related to the Pompeiu Problem*. colloquium. Odense University, Denmark, 17 September 1992.
- [37] *Hirzebruch’s Proportionality Principle, Discontinuous Groups and Proper Actions on Indefinite Riemannian Homogeneous Spaces*. Aarhus University, Denmark, 29 September 1992.
- [38] *Discrete Groups and Non-Riemannian Homogeneous Manifolds—On the Existence of Clifford–Klein Forms*. Geometry colloquium. the University of Tokyo, Japan, 19 November 1992.
- [39] *On a Criterion for Cohomologically Induced Unitary Representations to Decompose Discretely When Restricted to Reductive Subgroups*. Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, 7 December 1992.
- [40] *Branching Rules of Unitary Representations of Real Reductive Lie Groups and Non-commutative Harmonic Analysis*. Monday colloquium. the University of Tokyo, Japan, 21 December 1992.
- [41] New Year Free Talk. the University of Tokyo, Japan, January 1993.
- [42] *Branching Rules of Unitary Representations of Reductive Lie Groups and Non-commutative Harmonic Analysis*. colloquium. Tottori University, Japan, March 1993.
- [43] *Discrete Decomposability of  $A_q(\lambda)$  with Respect to Reductive Subgroups*. colloquium. Kyoto University, Japan, 6 April 1993.
- [44] *Actions of Discrete Groups on Non-Riemannian Homogeneous Spaces*. Geometry Seminar. Keio University, Japan, 10 May 1993.

- [45] *Introduction to Holomorphic Discrete Series Representations I, II.* Workshop on Representation Theory of Classical Groups, Quantum Groups, and Hecke Algebras, and Combinatorial Theory. RIMS, Kyoto University, Japan, 24–28 May 1993.
- [46] *Compact Clifford–Klein Forms of Semisimple Symmetric Spaces.* Problems on Structure and Representations of Lie Groups. RIMS, Kyoto University, Japan, 26–29 November 1993.
- [47] *Discontinuous Groups for Pseudo-Riemannian Homogeneous Spaces—Calabi–Markus Phenomenon, Uniform Lattice and Local Rigidity.* NUS-JSPS Seminar on Representation Theory and Number Theory. the University of Tokyo, Japan, 1–4 November 1993.
- [48] *Discontinuous Groups Acting on Homogeneous Spaces with Indefinite Metric.* Symposium on Topology from Transformation Group Theoretic Approaches. Atami, Japan, November 1993.
- [49] *Introduction to Unitary Representation Theory of Semisimple Lie Groups—Vogan–Zuckerman’s Derived Functor Modules, and Discretely Decomposable Unitary Representations.* (plenary lecture), Symposium on Representation Theory. Izu–Atagawa, Japan, 23–26 November 1993.
- [50] *On Discontinuous Groups.* informal seminar by Aomoto. Nagoya University, Japan, June 1994.
- [51] *Plancherel Theorem for Complex Homogeneous Spaces.* Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, 21 June 1994.
- [52] *Plancherel Theorem for Complex Homogeneous Spaces II.* Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, 28 June 1994.
- [53] *Discontinuous Groups Acting on Homogeneous Spaces.* (4 lectures), European School on Group Theory. Denmark, 15–26 August 1994.
- [54] *Clifford–Klein Forms of Homogeneous Spaces.* International Conference by Kanai and Zimmer. Keio University, Japan, August 1994.
- [55] *The Criterion for Properly Discontinuous Actions of Discrete Subgroups and for Proper Actions of Subgroups Acting on Homogeneous Spaces of Reductive Lie Groups.* Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, 25 October 1994.
- [56] *On the Criterion of Proper Actions and the Discontinuous Duality Theorem.* Survey Seminar in Lie Groups and Representation Theory. the University of Tokyo, Japan, 15 November 1994.
- [57] *Integral Geometry for Submanifolds in Complex Manifolds, and Plancherel Formula for Complex Homogeneous Spaces.* Symposium on Representation Theory. Toyama, Japan, 16–19 November 1994.
- [58] *Properly Discontinuous Actions on Homogeneous Spaces, and Clifford–Klein Forms.* (series lectures), Surveys in Lie Groups and Representation Theory. the University of Tokyo, Japan, 19–22 December 1994.

- [59] *On the Criterion for Discrete Group Actions on Homogeneous Spaces to be Properly Discontinuous*. Fifth Workshop on Representation of Lie Groups. Tottori University, Japan, 8–10 January 1995.
- [60] *Cohomology Groups of Locally Symmetric Spaces and Vogan–Zuckerman’s Derived Functor Modules*. RIMS, Kyoto University, Japan, 9–13 January 1995.
- [61] *Introduction to Harmonic Analysis on Spherical Homogeneous Manifolds*. Workshop on Homogeneous Spaces and Automorphic Forms. Rikkyo University, Japan, January 1995.
- [62] *Discrete Decomposability of  $A_q(\lambda)$  with Respect to Reductive Subgroups and its Applications*. Seminar on Lie groups. Rutgers University, USA, 7 April 1995.
- [63] *Discontinuous Groups and Clifford–Klein Forms of Pseudo-Riemannian Homogeneous Manifolds*. colloquium. Rutgers University, USA, 7 April 1995.
- [64] *Discontinuous Groups for Homogeneous Spaces and Non-Riemannian Geometry*. (4 lectures). Kyoto University, Japan, 26, 27, 29, 30 June 1995.
- [65] *Restriction of Irreducible Unitary Representations to Reductive Subgroups and their Applications*. Functional Analysis Seminar, organized by Professor Hirai. Kyoto University, Japan, 27 June 1995.
- [66] *Integral Geometry of Submanifolds*. colloquium. Kyoto University, Japan, 28 June 1995.
- [67] *Introduction to Harmonic Analysis on Spherical Homogeneous Spaces*. Summer School on Number Theory. Nagano, Japan, July 1995.
- [68] *Discontinuous Groups and Clifford–Klein Forms of Pseudo-Riemannian Homogeneous Manifolds*. Institut Mittag-Leffler, Stockholm, Sweden, 3 October 1995.
- [69] *Harmonic Analysis on Noncompact Complex Homogeneous Manifolds and Integral Geometry*. Annual Meeting of Swedish Mathematical Society. Lund University, Sweden, 20 October 1995.
- [70] *A Universal Formula in Integral Geometry*. Institute seminar. Institut Mittag-Leffler, Stockholm, Sweden, 30 November 1995.
- [71] *Restriction of the Irreducible Unitary Representation  $A_q(\lambda)$  with Respect to Reductive Subgroups*. Institut Mittag-Leffler, Stockholm, Sweden, 1 February 1996.
- [72] *The Middle Hodge Components of Certain Modular Symbols on Arithmetic Quotients of Type IV Bounded Symmetric Domains*. Institut Mittag-Leffler, Stockholm, Sweden, 6 February 1996.
- [73] *Discrete Series for Certain Spherical Homogeneous Spaces*. Institut Mittag-Leffler, Stockholm, Sweden, 13 February 1996.
- [74] *Compact Clifford–Klein Forms of Semisimple Symmetric Spaces*. Institut Mittag-Leffler, Stockholm, Sweden, 22 May 1996.

- [75] *Representations on Dolbeault Cohomologies and Restriction Problems*. CIME Session “Integral Geometry, Radon Transforms, and Complex Analysis”. Venice, Italy, 3–12 June 1996.
- [76] *Clifford–Klein Forms of Pseudo-Riemannian Symmetric Spaces*. Politecnico di Torino (Seminar organized by Prof. Fulvio Ricci). Italy, 14 June 1996.
- [77] *Restriction of Irreducible Unitary Representations of Semisimple Lie Groups and its Applications to Modular Symbols*. International Conference “Analysis, Arithmetic and Geometry on Reductive Groups”, Summer Solstice Days. Université de Paris VI & VII, France, 17–21 June 1996.
- [78] *Clifford–Klein Forms of Homogeneous Spaces of Reductive Lie Groups*. CIMPA School. Monastir, Tunisia, 14 July–2 August 1996.
- [79] *Restriction of Unitary Representations*. CIMPA School. Monastir, Tunisia, 14 July–2 August 1996.
- [80] *Restriction of Unitary Representations of Real Reductive Lie Groups*. Analysis Seminar. Aarhus University, Denmark, 16 August 1996.
- [81] *On the Restriction of Unitary Representations and its Applications*. Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, 8 October 1996.
- [82] *Vanishing Theorem of Modular Symbols on Locally Symmetric Spaces*. Workshop on Representation Theory and Related Topics. Kurashiki, Japan, 5–8 November 1996.
- [83] *The Restriction of Unitary Representations and its Applications*. Symposium on Representation Theory. Aichi, Japan, 19–22 November 1996.
- [84] *Discrete Series Representations for (Non-symmetric) Homogeneous Spaces of Reductive Type*. Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, 10 December 1996.
- [85] *Restriction of Unitary Representations and Some Applications*. seminar. National University of Singapore (NUS), Singapore, 16 December 1996.
- [86] *On the ‘Dual Pair Correspondence’ for the minimal Representation of  $O(p, q)$* . Tottori Symposium on Representation Theory. Tottori University, Japan, 5–8 January 1997.
- [87] *Conformal Geometry and Branching Laws for Unitary Representations Attached to Minimal Nilpotent and Elliptic Orbits*. Lie Group Seminar, organized by Simon Gindikin. Rutgers University, USA, April 1997.
- [88] *Conformal Geometry and Branching Laws for Unitary Representations Attached to Minimal Nilpotent and Elliptic Orbits*. The Gelfand Seminar. Rutgers University, USA, April 1997.
- [89] *Compact Clifford–Klein Forms of Homogeneous Manifolds*. AMS 1997 Spring Eastern Sectional Meeting, University of Maryland at College Park, USA, 12–13 April 1997.

- [90] *On the Discontinuous Groups for Pseudo-Riemannian Homogeneous Spaces and its Deformation Theory.* Joint seminar of Geometry Colloquium–Lie Groups and Representation Theory. the University of Tokyo, Japan, 22 May 1997.
- [91] *Discrete Branching Laws of Unitary Representations and their Applications.* colloquium. Kobe University, Japan, 6 June 1997.
- [92] *Minimal Representations of  $SO(p, q)$ , Conformal Geometry, and the ‘Dual Pair’ Correspondences.* Saturday Seminar on Automorphic Forms. the University of Tokyo, Japan, July 1997.
- [93] *Restriction of Unitary Representations of Reductive Lie Groups.* International Symposium on Representation Theory and Homogeneous Spaces, Hayashibara Forum. Okayama, Japan, 27 July–1 August 1997.
- [94] *Restriction of Unitary Representations of Real Reductive Lie Groups.* Workshop on Analysis on Lie Groups and Homogeneous Spaces. Department of Mathematics, University of Copenhagen, Denmark, 19–23 August 1997.
- [95] *Discrete Branching Laws of Unitary Representations.* Annual Meeting of the Mathematical Society of Japan. the University of Tokyo, Japan, October 1997.
- [96] *Invariant Measure on (Non-symmetric) Homogeneous Spaces of Reductive Type.* Annual Meeting of the Mathematical Society of Japan. the University of Tokyo, Japan, October 1997.
- [97] *Discrete Series Representations for (Non-symmetric) Homogeneous Spaces of Reductive Type.* Annual Meeting of the Mathematical Society of Japan. the University of Tokyo, Japan, October 1997.
- [98] *Conformal Geometry, Minimal Representations, and the Dual Pair Correspondences.* Annual Meeting of the Mathematical Society of Japan. the University of Tokyo, Japan, October 1997.
- [99] *Conformal Geometry and Unipotent Branching Laws of  $O(p, q)$  Attached to Minimal Nilpotent Orbits.* Workshop on Invariant Differential Operators, Special Functions and Representation Theory (organized by Toshio Oshima). RIMS, Kyoto University, Japan, 20–31 October 1997.
- [100] *Compact Indefinite Kähler Manifolds as Clifford–Klein forms of reductive homogeneous spaces.* Workshop on Complex Geometry and Group Actions. Gifu University, Japan, 1–3 November 1997.
- [101] *Non-Riemannian homogeneous manifolds and discontinuous groups.* colloquium. Osaka University, Japan, 10 November 1997.
- [102] *Multiplicity Free Branching Laws for Unitary Highest Weight Modules.* Symposium on Representation Theory (organized by K. Mimachi and S. Takenaka). Saga, Japan, 17–20 November 1997.
- [103] *Invariant Measures on (Non-symmetric) Homogeneous Spaces of Reductive Type.* Workshop on Geometry and Lie Groups. Yamaguchi University, Japan, December 1997.

- [104] *Unitary Highest Weight Modules and Multiplicity Free Branching Laws*. (3 lectures). the University of Tokyo, Japan, 26–28 January 1998.
- [105] *Survey on the Theory of Infinite Dimensional Representations of Semisimple Lie Groups, with Focus on the Classification and Construction of Irreducible Representations*. (2 lectures), Geometry Seminar (organized by Masahiko Kanai and Koji Fujiwara). Keio University, Japan, 9, 10 March 1998.
- [106] *Introduction to Clifford–Klein Forms of Pseudo-Riemannian Homogeneous Manifolds, and Discontinuous Groups*. Geometry Seminar (organized by Masahiko Kanai and Koji Fujiwara). Keio University, Japan, 11 March 1998.
- [107] *Discrete and Continuous—Branching Laws of Infinite Dimensional Representations and their Applications*. (plenary lecture), Annual Meeting of Mathematical Society of Japan. Meijo University, Japan, March 1998.
- [108] *Compact Clifford–Klein Forms of Pseudo-Riemannian Homogeneous Manifolds*. Séminaire de Mathématiques Pures. École Normale Supérieure de Lyon, France, 13 May 1998.
- [109] *Discrete Branching Laws of Unitary Representations*. Séminaire d’Algèbre. Institut Girard Desargues, Université Claude Bernard Lyon I, 28 May 1998.
- [110] *Compact Clifford–Klein Forms of Pseudo-Riemannian Homogeneous Manifolds*. Arthur L. Besse Round Table in Global Pseudo-Riemannian Geometry. Université Henri Poincaré, Nancy, France, 6 June 1998.
- [111] *Restriction of Unitary Representations and Discrete Series Representations for Non-symmetric Spaces*. Groupe de travail, Analyse sur les Espaces Symétriques (organized by Faraut). Université de Paris VI, France, 10 June 1998.
- [112] *Conformal Geometry and Minimal Unipotent Representations*. Symposium on Lie Groups and Geometry. Yokohama, Japan, December 1998.
- [113] *Unitary Highest Weight Modules and Multiplicity-free Branching Laws*. (series lectures). Nagoya University, Japan, 11–14 January 1999.
- [114] *On a Phenomenon that a Non-compact Group Behaves as if it were a Compact Group*. colloquium. Nagoya University, Japan, 13 January 1999.
- [115] *Restriction of Unitary Representations with Respect to Reductive Subgroups*. Seminar Sophus Lie. Technische Universität Clausthal, Germany, 5–6 February 1999.
- [116] *A Vanishing Theorem for Modular Symbols of Locally Riemannian Symmetric Spaces*. Joint seminar of University of Göttingen–Clausthal University. Germany, 8 February 1999.
- [117] *Compact Clifford–Klein Forms of Pseudo-Riemannian Homogeneous Manifolds*. colloquium. University of Göttingen, Germany, 11 February 1999.
- [118] *Theory of Discretely Decomposable Restrictions of Unitary Representations of Semisimple Lie Groups, and Some Applications*. plenary address (Award Lecture), Annual Meeting of Mathematical Society of Japan. Gakushuin University, Japan, March 1999.

- [119] *Conformal Geometry and Branching Laws of  $O(p, q)$  Attached to Minimal Nilpotent Orbits.* Groupe de travail, Analyse sur les Espaces Symétriques. Université de Paris VI, France, 8 April 1999.
- [120] *On Discontinuous Groups Acting on Pseudo-Riemannian Homogeneous Spaces.* Joint seminar of Topology–Lie Groups and Representation Theory. the University of Tokyo, Japan, 11 May 1999.
- [121] *The Restriction of Unitary Highest Representations of Reductive Lie Groups and its Multiplicities.* International Conference, Summer Solstice Days. Université de Paris VI & VII, France, June 1999.
- [122] *Restriction of Unitary Representations of Reductive Groups.* (4 lectures), Summer School on Representation Theory of Lie Groups. Yonsei University, Seoul, Republic of Korea, 20–22 July 1999.
- [123] *On Discontinuous Groups for Homogeneous Spaces.* (plenary lecture), Geometry Symposium. the University of Tokyo, Japan, 2–5 August 1999.
- [124] *Multiplicity-free Theorem in Branching Problems of Unitary Highest Weight Modules.* the Copenhagen Workshop (organized by M. Flensted-Jensen and H. Schlichtkrull). Denmark, 26–27 August 1999.
- [125] *Geometry of Homogeneous Spaces and Discontinuous Groups.* (5 lectures). Hokkaido University, Japan, 1–5 November 1999.
- [126] *Discontinuous Groups for Homogeneous Spaces.* (plenary lecture), Symposium on Representation Theory. Chiba, Japan, 15–18 November 1999.
- [127] *A Note on Caratheodory Metric.* Workshop on Representation Theory. Wakayama, Japan, 6–8 January 2000.
- [128] *Geometric Approach to Discretely Decomposable Restrictions.* Workshop on the Geometry of Nilpotent Orbits and Representation Theory. Kyoto University, Japan, 31 January–3 February 2000.
- [129] *A Generalization of the Kostant–Schmid Formula.* Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, 18 April 2000.
- [130] *Branching Laws of Unitary Highest Weight Modules with Respect to Semisimple Symmetric Pairs.* (opening lecture), Representation Theory and Complex Analysis. Oberwolfach, Germany, 23–29 April 2000.
- [131] *Discrete Decomposable Restrictions and Geometry of Locally Symmetric Spaces.* Workshop in Representation Theory and Automorphic Forms (organized by J.-S. Li). Hangzhou, China, June 2000.
- [132] *Branching Problems and Unitary Representations.* (8 lectures), European School on Group Theory. SDU–Odense University, Denmark, 14–26 August 2000.
- [133] *Discontinuous Subgroups for Non-Riemannian Homogeneous Spaces.* MIT Lie Groups Seminar (organized by David Vogan). USA, 25 October 2000.

- [134] *Discrete Decomposable Restrictions of Unitary Representations.* colloquium. Oklahoma State University, USA, 1 December 2000.
- [135] *Discrete Groups for Pseudo-Riemannian Homogeneous Spaces.* Lie Group Seminar (organized by Korany, cosponsored by Baruch). City University of New York, USA, 12 December 2000.
- [136] *Discontinuous Groups for Non-Riemannian Homogeneous Manifolds and Deformations of Clifford–Klein Forms.* (2 lectures), The 2000 Twente Conference on Lie Groups. University of Twente, Enschede, the Netherlands, 18–20 December 2000.
- [137] *Conformal Geometry and Analysis on the Minimal Representation of  $O(p, q)$ .* MIT Lie Groups Seminar (organized by David Vogan). USA, 4 April 2001.
- [138] *Restriction of Representations to Reductive Subgroups.* (24 lectures). Harvard University, USA, April–May 2001.
- [139] *Discretely Decomposable Restriction of Unitary Representations and a Vanishing Theorem for Modular Symbols.* 2001 Midwest Workshop in Lie Theory, Representation Theory and Automorphic Forms (organized by Moy). University of Michigan in Ann Arbor, USA, 11–13 May 2001.
- [140] *Conformal Geometry and Analysis on Minimal Representations.* Workshop on Integral Geometry in Representation Theory. MSRI, Berkeley, USA, 8–12 October 2001.
- [141] *Multiplicity One Theorem of Branching Laws.* MSRI seminar (organized by Gindikin). Berkeley, USA, 20 November 2001.
- [142] *Multiplicity-free Branching Theorem.* (3 lectures). the University of Tokyo, Japan, 5, 12, 19 December 2001.
- [143] *Multiplicity One Theorem of Branching Laws.* Lie Groups and Representation Theory Seminar. the University of Tokyo, Japan, 18 December 2001.
- [144] *Canonical Hilbert Space of Ultrahyperbolic Solutions.* (closing lecture), Makuhari Workshop (organized by Kumahara and Nomura). Chiba, Japan, 6–8 January 2002.
- [145] *Conformal Geometry and Analysis on Minimal Representations.* (3 plenary lectures), The 22nd Winter School on Geometry and Physics. Srni, Czech Republic, 12–19 January 2002.
- [146] *On the Canonical Inner Product on the Solution Space of the Yamabe Operator.* Symposium on Various Geometric Structures. Nippon Institute of Technology, Japan, 6–8 March 2002.
- [147] *On the Branching Laws of Infinite Dimensional Representations.* (5 lectures). the University of Tokyo, Japan, 17–21 June 2002.
- [148] *Canonical Hilbert Spaces of Ultrahyperbolic Solutions.* colloquium. the University of Tokyo, Japan, 21 June 2002.



- [149] *On the Invariant Inner Product on the Space of Global Solutions of the Yamabe Operator.* Workshop on Representations of Noncommutative Algebraic Systems and Harmonic Analysis. RIMS, Kyoto University, Japan, 23–26 July 2002.
- [150] *Conformal Geometry and Analysis on Minimal Representations of  $O(p, q)$ .* Workshop on Representation Theory of Lie Groups, Special Year Program on Representation Theory of Lie Groups (organized by Jeffrey Adams, Jian-Shu Li, Kyo Nishiyama, Dipendra Prasad, Gordan Savin, Eng-Chye Tan and Chen-Bo Zhu). Institute for Mathematical Sciences (IMS), Singapore, 13 August 2002.
- [151] *Branching Problems of Unitary Representations.* (invited lecture), International Congress of Mathematicians (ICM 2002). Beijing, China, 20–28 August 2002.
- [152] *Conformal Geometry and Global Solutions to the Yamabe Equations on Classical Pseudo-Riemannian Manifolds.* Special Year Program on Representation Theory of Lie Groups (organized by Eng-Chye Tan and Chen-Bo Zhu). Institute for Mathematical Sciences (IMS), Singapore, 24 September 2002.
- [153] *Restriction of Unitary Representations.* Special Year Program on Representation Theory of Lie Groups (organized by Eng-Chye Tan and Chen-Bo Zhu). Institute for Mathematical Sciences (IMS), Singapore, 1 October 2002.
- [154] *Complex Geometry and Multiplicity One Theorem in Branching Laws.* Lie Groups and Representation Theory Seminar. National University of Singapore, Singapore, 22 October 2002.
- [155] *Branching Problems of Unitary Representations.* (series lectures), Symposium on Representation Theory. Shizuoka, Japan, 12–15 November 2002.
- [156] *Multiplicity One Theorem in the Branching Laws.* Workshop on Representations of Lie Groups, Harmonic Analysis on Homogeneous Spaces and Quantization (organized by G. van Dijk and V. F. Molchanov). Lorentz Center, Leiden University, the Netherlands, 9–13 December 2002.
- [157] *Conformal Geometry and Analysis on Minimal Representations of  $O(p, q)$ .* The 2002 Twente Conference on Lie Groups. Twente University, the Netherlands, December 2002.
- [158] *The Schrödinger Model of the Minimal Representation of  $O(p, q)$ .* (closing lecture), Workshop on Automorphic Forms on Bounded Symmetric Domains of Type IV (organized by T. Oda). RIMS, Kyoto University, Japan, 24–26 December 2002.
- [159] *The Schrödinger Model of the Minimal Representation of the Lorentz Group.* Makuhari Workshop. Chiba, Japan, 6–8 January 2003.
- [160] *Analysis on Minimal Representations and Conformal Geometry.* Séminaire d'Analyse Harmonique. Institut de Mathématiques Élie Cartan, Université Henri Poincaré, France, 15 May 2003.
- [161] *Branching Problems of Representations of Lie Groups.* colloquium. Université de Reims, France, 12 June 2003.

- [162] *A Multiplicity Theorem in the Branching Laws of Representations.* Théorie des Représentations, Théorie des Groupes. Université de Paris VII, France, 16 June 2003.
- [163] *Multiplicity One Theorem on Branching Laws and Geometry of Complex Manifolds.* (opening lecture), RIMS Workshop on Expansion of Lie Theory and New Advances. Kyoto, Japan, 22–25 July 2003.
- [164] *On Discontinuous Groups for Non-Riemannian Homogeneous Spaces.* (invited address at Geometry Session), Annual Meeting of Mathematical Society of Japan. Chiba University, Japan, September 2003.
- [165] *Restriction of Unitary Representations.* JSPS–DFG Seminar, Lie Groups: Analysis and Geometry. Kyoto University, 6–11 October 2003.
- [166] *Survey Lecture on Representation Theory of Lie Groups; Restriction of Unitary Representations.* (2 lectures). Seoul National University, Republic of Korea, November 2003.
- [167] *On Multiplicity-free Representations.* colloquium. Kyoto University, Japan, 26 November 2003.
- [168] *On Discontinuous Groups for Non-Riemannian Homogeneous Spaces.* colloquium. Tokyo Institute of Technology, Japan, 8 December 2003.
- [169] *Group Action on Homogeneous Spaces Having Indefinite Metric.* (series lectures). Tokyo Institute of Technology, Japan, 8–12 December 2003.
- [170] *On the Double Coset Space  $U(n_1) \times U(n_2) \times U(n_3) \backslash U(n) / U(p) \times U(q)$ —Visibility of the Action, and a Generalization of the Cartan Decomposition.* Makuhari Workshop. Chiba, Japan, 6–8 January 2004.
- [171] *Visible Actions on Complex Homogeneous Manifolds and their Application to Representation Theory.* (5 lectures). the University of Tokyo, Japan, 19–23 January 2004.
- [172] *Visible Actions on Complex Manifolds, and their Applications to Representation Theory.* Mathematisches Kolloquium. Technische Universität Clausthal, Germany, 30 January 2004.
- [173] *Visible Actions on Complex Manifolds and Multiplicity One Theorems.* (opening lecture), Finite and Infinite Dimensional Complex Geometry and Representation Theory (organized by Alan T. Huckleberry, Karl-Hermann Neeb and Joseph A. Wolf). Oberwolfach, Germany, 1–7 February 2004.
- [174] *On Complex Geometry and Multiplicity-free Representations.* Fourth Workshop on Nilpotent Orbits and Representation Theory. Nagoya University, Japan, 21–24 February 2004.
- [175] *Symmetry and Geometry—Continuous Groups and Discontinuous Groups.* RIMS, Kyoto University, Japan. 28 May 2004.

- [176] *Restriction of Unitary Representations of Reductive Lie Groups*. International Symposium on Representation Theory and Harmonic Analysis. Urumqi, Xinjiang, China, 2–8 August 2004.
- [177] *Visible Actions on Complex Manifolds and Multiplicity-free Representations*. (closing lecture), Conference on Lie Groups and Representation Theory. Odense, Denmark, 10–13 August 2004.
- [178] *Schrödinger Model of the Minimal Representation of the Lorentz Group  $O(p, q)$* . Workshop on Harmonic Analysis and Homogeneous Spaces (in honor of Professor G. van Dijk). Lorentz Center, Leiden University, the Netherlands, 23–26 August 2004.
- [179] *Restriction of Unitary Representations—Discrete and continuous spectrum*. (plenary lecture), Sixth Pan-African Congress of Mathematicians (PACOM2004). Institut National des Sciences Appliquées et de la Technologie (INSAT), Tunis, Tunisia, September 2004.
- [180] *Conformal Geometry and Analysis on Minimal Representation of  $O(p, q)$* . PACOM2004, Parallel Session: Lie Groups and Representation Theory. Tunis, Tunisia, September 2004.
- [181] *Restriction of Unitary Representations of Real Reductive Groups*. (closing lecture), Conference on Nilpotent Orbits and Representation Theory 2004. Kawaguchiko, Japan, 6–10 September 2004.
- [182] *A Fourier-Transform Formula of the Minimal  $K$ -type of the Minimal Representation*. RIMS Workshop on Automorphic Forms of  $Sp(2, \mathbb{R})$  and  $SU(2, 2)$ , III. Kyoto, Japan, September 2004.
- [183] *Multiplicity-free Representations*. colloquium. Osaka City University, Japan, 2 February 2005.
- [184] *Multiplicity-free Representations and Visible Actions on Complex Manifolds*. (4 lectures). Osaka City University, Japan, 31 January–4 February 2005.
- [185] *Visible Actions on Complex Manifolds and Multiplicity-free Theorems*. (2 lectures), International Symposium on Representation Theory and Automorphic Forms. Seoul National University, Seoul, Republic of Korea, 14–17 February 2005.
- [186] *Analysis on Minimal Representation of Indefinite Orthogonal Groups*. Séminaire Théorie de Lie et Applications, Groupe de travail. Université de Poitiers, France, 26 May 2005.
- [187] *Visible Actions on Complex Manifolds and Multiplicity-free Representations*. Séminaire Théorie de Lie et applications. Université de Poitiers, France, 2 June 2005.
- [188] *Analysis on Homogeneous Spaces Revisited—From Viewpoint of Branching Laws of Unitary Representations*. Harmonic Analysis on Lie Groups and Symmetric Spaces in honor of Jacques Faraut, Joint meeting of Seminar Sophus Lie. Nancy, France, 10–11 June 2005.

- [189] *Integral Formulas for the Minimal Representation of the Conformal Group*. Seminar organized by Professor Faraut. Analyse Algébrique, Université Pierre et Marie Curie, France, 22 June 2005.
- [190] *Introduction to Lie Groups and Representation Theory*. RIMS, Kyoto University, Japan. 8 July 2005.
- [191] *Multiplicity-free Theorem and Visible Actions on Complex Manifolds*. The Asian Mathematical Conference (AMC2005). Singapore, 20–23 July 2005.
- [192] *Multiplicity-free Representations and Visible Actions on Complex Manifolds: 1. Multiplicity-free theorem; 2. Visible actions on symmetric spaces; 3. Visible actions on non-symmetric spaces*. (3 lectures), Workshop on Integral Transformations on Homogeneous Spaces (organized by Toshio Oshima). Tambara Institute of Mathematical Sciences, the University of Tokyo, Japan, 21–25 August 2005.
- [193] *Visible Actions on Complex Manifolds and Multiplicity-free Representations*. RIMS Symposium on Development of Cartan Geometry and Related Mathematical Problems (organized by Tohru Morimoto). RIMS, Kyoto University, Japan, 24–27 October 2005.
- [194] *Multiplicity-free Representations and Visible Actions on Complex Manifolds*. (expository lecture), Symposium on Representation Theory. Kakegawa, Japan, 15–18 November 2005.
- [195] *Restrictions of Unitary Representations of Real Reductive Groups*. International Conference on Representations of Real Reductive Groups, in honor of R. Parthasarathy. Mumbai, India, 2–5 January 2006.
- [196] *Multiplicity-free Representations and Visible Actions on Complex Manifolds*. (opening lecture), International Conference on Harmonic Analysis, Group Representations, Automorphic Forms and Invariant Theory (on the Occasion of Professor Roger Howe’s 60th Birthday). Singapore, 9–11 January 2006.
- [197] *On Visible Actions on Complex Manifolds*. Geometric Aspects of Homogeneous Spaces (on the Occasion of Professor Soji Kaneyuki’s 70th Birthday). Meijo University, Japan, 2–4 March 2006.
- [198] *What Are Possible Global Forms of Locally Symmetric Spaces?* colloquium. Kyoto University, Japan, 12 April 2006.
- [199] *Group Actions and Representations of Lie Groups*. (5 lectures). Hiroshima University, Japan, 24–28 April 2006.
- [200] *Visible Actions and Multiplicity-free Representations*. colloquium. Hiroshima University, Japan, 25 April 2006.
- [201] *Topics on Unitary Representation Theory by Complex Analytic Methods*. (5 lectures). the University of Tokyo, Japan, 8–12 May 2006.
- [202] *Mathematics of Symmetry*. RIMS, Kyoto University, Japan. 26 May 2006.
- [203] *Is the Universe Closed?—Existence Problem of Compact Clifford–Klein Forms of Symmetric Spaces*. colloquium. Universität Paderborn, Germany, 4 July 2006.

- [204] *Branching Problems of Unitary Representations*. “Perspectives in Representation Theory” Strategic Workshop and Round Table Discussion (organized by Steffen Koenig, Henning Krause, Peter Littelmann, and Gunter Malle). Physikzentrum Bad Honnef, Germany, 7–9 July 2006.
- [205] *Is the Universe Closed?—Existence Problem of Compact Locally Symmetric Spaces*. colloquium. Technische Universität Darmstadt, Germany, 12 July 2006.
- [206] *Compact Clifford–Klein Forms of Non-Riemannian Symmetric Spaces*. Mini-Workshop on Lie groups, Algebraic Groups and Transformation Groups (organized by H. Abels and E. Vinberg). Universität Bielefeld, Germany, 15–16 July 2006.
- [207] *Unitary Representations, Restrictions, and their Applications*. (course lectures), Summer School: Microlocal and Geometric Methods in Representation Theory. G nzburg, Germany, 17–28 July 2006.
- [208] *Clifford–Klein Forms of Non-Riemannian Homogeneous Spaces*. (course lectures), International Conference and Instructional Workshop: Geometry Topology, Analysis of Locally Symmetric Spaces and Discrete Groups (organized by Shing-Tung Yau (chair), Lizhen Ji, Kefeng Liu, Nanhua Xi Hongwei Xu, Lo Yang, Zhu-Jun Zheng and Xiangyu Zhou). Beijing, Republic of China, 17 July–4 August 2006.
- [209] *Multiplicity-free Representations and Visible Actions on Complex Manifolds*. The 53rd Geometry Symposium (organized by Kenji Fukaya, Takao Yamaguchi, Atsushi Kasue and Akito Futaki). Kanazawa University, Japan, 5–8 August 2006.
- [210] *Conformally Invariant Hilbert Structure on the Solution Space of the Ultrahyperbolic Laplace Equation on  $\mathbb{R}^{p+q}$* . Tsukuba Conference on Integral Geometry and Harmonic Analysis (organized by Fulton Gonzalez, Tomoyuki Takehi and Toshio Oshima). University of Tsukuba, Japan, 7–10 August 2006.
- [211] *On Compact Locally Symmetric Spaces*. RIMS Workshop on Representation Theory and Analysis on Homogeneous Spaces (organized by Hideko Sekiguchi). RIMS, Kyoto University, Japan, 21–24 August 2006.
- [212] *Visible Actions on Complex Manifolds*. Workshop on Representation Theory and Prehomogeneous Vector Spaces (organized by Yumiko Hironaka, Iris Muller, Hiroyuki Ochiai, Hubert Rubenthaler, Fumihiro Sato). Institut de Recherche Math matique Avanc e (IRMA), Strasbourg, France, 11–14 September 2006.
- [213] *Multiplicity-free Representations and Visible Actions on Complex Manifolds*. Analysis Seminar. University of Aarhus, Denmark, 18 September 2006.
- [214] The 24th Osaka Science Prize Lecture. Osaka Science & Technology Center, Japan, 1 November 2006.
- [215] *On Compact Locally Symmetric Spaces*. International Conference on Harmonic Analysis and Applications. Sousse, Tunisia, 6–11 November 2006.
- [216] *Topics on Discontinuous Groups*. (5 lectures). Nagoya University, Japan, 29 January–1 February 2007.
- [217] *Topics on Discontinuous Groups*. colloquium. Nagoya University, Japan, 29 January 2007.

- [218] *Existence Problem of Compact Locally Symmetric Spaces*. Tuesday Seminar on Topology. University of Tokyo, Japan, 17 April 2007.
- [219] *Branching Problems of Unitary Representations*. (2 lectures), Sackler Distinguished Lectures in Pure Mathematics. Tel Aviv University, Israel, 7, 9 May 2007.
- [220] *Existence Problem of Compact Locally Symmetric Spaces*. Journées Solstice d'été 2007: Théorie de Lie, Géométrie et Représentations (organized by B. Keller, B. Klingler, R. Rentschler and O. Schiffmann). Institut de Mathématiques de Jussieu, Paris, France, 21–23 June 2007.
- [221] *The unitary inversion operator on the  $L^2$  model of a minimal representation*. Journée-GAG. Poitiers, France, 25 June 2007.
- [222] *Visible Actions on Symmetric Spaces and Multiplicity-free Representations*. Bonn–Cologne algebra seminar (organized by Peter Littelmann). Universität zu Köln, Germany, 3 July 2007.
- [223] *Multiplicities in the Decomposition of Unitary Representations of Reductive Lie Groups*. (opening lecture), Lie Groups, Algebraic Groups and Transformation Groups: A conference in honor of Ernest B. Vinberg's 70th birthday (organized by Herbert Abels, Vladimir Chernousov, Gregory Margulis, Detlev Poguntke, and Katrin Tent). Universität Bielefeld, Germany, 20–24 July 2007.
- [224] *On Locally Symmetric Spaces*. (closing lecture), Representation Theory, Complex Analysis and Integral Geometry (organized by Simon Gindikin and Bernhard Krötz). Max-Planck-Institut für Mathematik, Bonn, Germany, 25–27 July 2007.
- [225] *On a Conjecture of Sunada and Theory of Discretely Decomposable Restrictions of Unitary Representations*. International Conference “Spectral Analysis in Geometry and Number Theory” on the occasion of Toshikazu Sunada's 60th birthday. Nagoya University, Japan, 6–10 August 2007.
- [226] *Branchings to Symmetric Pairs and Analysis on Symmetric Spaces*. International Conference on Integral Geometry, Harmonic Analysis and Representation Theory in honor of Sigurdur Helgason on the occasion of his 80th birthday. Reykjavik, Iceland, 15–18 August 2007.
- [227] *Fourier Transform on the Isotropic Cone for the Indefinite Quadratic Form*. Analysis Seminar. Aarhus University, Denmark, 23 August 2007.
- [228] *Multiplicity-Free Representations: Complex Geometric Methods in Representation Theory*. (about 36 lectures). Harvard University, USA, January–May 2008. promised.
- [229] *TBA*. Locally Symmetric Spaces (organized by Stephen Kudla, Juergen Rohlfs, Leslie Saper and Birgit Speh). Banff International Research Station, Canada, 18–23 May 2008. promised.
- [230] *TBA*. Conference in honor of Prof. Jean-Louis Clerc “Hermitian Symmetric Spaces, Jordan Algebras and Related Problems” (organized by Khalid Koufany and Wolfgang Bertram). Centre International de Recherches Mathématiques (CIRM), Luminy, France, 23–27 June 2008. promised.

- [231] *TBA*. Harmonic Analysis, Operator Algebras and Representation Theory (organized by Jean Ludwig and Anthony To-Ming Lau). Centre International de Recherches Mathématiques (CIRM), Luminy, France, 3–7 November 2008. promised.
- [232] *TBA*. Conference on Representation Theory. The Institut Henri Poincaré, Paris, France, 15–18 December 2008. promised.