

## CURRICULUM VITA

November 16, 2011

Name: TERAO, Hiroaki (Mr.)      Sex: Male

Present Professional Address: Mathematics Department  
Hokkaido University  
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Date of birth: August 13, 1951      Birth Place: Tokyo, Japan

### Education:

1. University of Tokyo, B. Sc., March 1974
2. University of Tokyo, M. Sc., March 1976
3. Kyoto University, D. Sc., Mar. 1981

### Full-Time University Positions:

1. International Christian University, Assistant, Apr. 1977-Mar. 1979
2. International Christian University, Instructor, Apr. 1979-Mar. 1981
3. International Christian University, Assistant Professor, Apr. 1981-Mar. 1985
4. University of Wisconsin (Madison), Visiting Assistant Professor, Sep. 1982-Jun. 1983
5. International Christian University, Associate Professor, Apr. 1985- Sep. 1991
6. Ohio State University, Visiting Associate Professor, Sep. 1987-June 1988
7. University of Wisconsin (Madison), Visiting Associate Professor, Sep. 1988-Aug. 1990
8. University of Wisconsin (Madison), Associate Professor, Aug. 1990- May 1993
9. University of Wisconsin (Madison), Professor, Aug. 1993-May 1999

10. Hokkaido University, Professor, July 1, 1996 - March 31, 1998
11. Tokyo Metropolitan University, Professor, April 1, 1998 - March 31, 2006
12. Hokkaido University, Professor, April 1, 2006 -
13. Hokkaido University, Dean, Graduate School of Science, April 1, 2011 -

Part-time University Positions:

1. Aoyama Gakuin University, Part-time Lecturer, Sep. 1976-Feb. 1977
2. Tokyo Metropolitan University (Graduate School), Part-time Lecturer, Nov. 1979-Mar. 1980,
3. Hokkaido University, Visiting Lecturer, Jan. 1981
4. Tokyo Metropolitan University (Graduate School), Part-time Lecturer, Nov. June 1992 (Shuuchuu Koogi).
5. Université de Nantes, France, Professeur invité, May 20 - June 19, 1995.
6. Tohoku University, Part-time Lecturer (Shuuchuu Koogi), May 1997
7. Kyushu University, Part-time Lecturer (Shuuchuu Koogi), June 1997
8. Saitama University, Part-time Lecturer (Shuuchuu Koogi), Nov. 1997
9. Okayama University, Part-time Lecturer (Shuuchuu Koogi), June 2001
10. Sophia University, Part-time Lecturer (Shuuchuu Koogi), December 2001
11. MSRI graduate workshop, organizer and instructor, Univ. Oregon, August 2004
12. University of Tokyo, Part-time Lecturer (Shuuchuu Koogi), May 2005

Research Positions:

1. Research Institute for Mathematical Sciences at Kyoto University  
Research Fellow  
Oct. 1974, Oct. 1975, Jul. 1979-Sep. 1979, Nov. 1980-Jan. 1981
2. Mittag-Leffler Institute, Sweden, Visiting member, May 1992.
3. Institute for Mathematical Sciences, University of Tokyo, Japan, Visiting researcher, Dec 25, 1994 – Jan 24, 1995.
4. Max-Planck-Institut für Mathematik, Visiting member, June 1 – July 31, 1995.

5. Mathematical Science Research Institute (MSRI), Berkeley, General member, Feb. 8 – March 31, 1997.
6. University of Wisconsin (Madison), Honorary Fellow, Oct. 2002 - Dec. 2002
7. Mathematical Science Research Institute (MSRI), Berkeley, Research professor, Aug. 16 – Dec. 17, 2004.
8. Pacific Institute for Mathematical Sciences (PIMS), Banff, visiting member (focussed research group), June 10 – 15, 2006.

Award:

1. Algebra Prize (Daisuugaku Shou), MSJ Algebra research Section (Daisuugaku Bunkakai), 2010.

Other Experiences:

1. Ph. D. committe member (reader) of Mr. Mike Falk (Univ. Wisconsin, Madison, WI, May, 1983)
2. Doctorat d'état committe member of Mr. Michel Jambu (Univ. Nantes, France, April, 1989)
3. Organizer of Workshop of Arrangements held at University of Wisconsin on Oct. 10, 1991. (12 participants from outside)
4. Organizer of Workshop of Arrangements held at University of Wisconsin on Oct. 10, 1992. (22 participants from outside)
5. Ph. D. committe member (reader) of Mr. Ken Jewell (Univ. Wisconsin, Madison, WI, May, 1993)
6. Ph. D. committe member (reader) of Mr. Kequan Ding (Univ. Wisconsin, Madison, WI, July, 1993)
7. Habilitation committe member (President) of Mr. Luis Paris (Univ. Bourgogne, Dijon, France, June, 1994)
8. Ph. D. committe member (reader) of Mr. Daniel Juan-Pineda (Univ. Wisconsin, Madison, WI, August, 1994)
9. Doctorat committe member of Mr. Patrick Lehebel (Univ. Nantes, France, May, 1995)
10. Hokkaido Math. Journal, editor, 1996-1998
11. Annals of Combinatorics, associate editor, 1997-

12. Organizer of Workshop on Mathematics Related to Arrangements of Hyperplanes held at Tokyo Metropolitan University, Jul. 13 - 18, 1998. (a regional workshop of Japan Mathematical Society) (24 participants from overseas)
13. JSPS Kagaku Kenkyuuhi Iinkai Senmon Iin, 2000-2001.
14. Tokyo J. of Math., editor, 2001-2003
15. JSPS Tokubetsu Kenkyuuin Tou Shinsakai Senmon Iin, 2001-2003
16. National Institution for Academic Degrees and University Evaluation, Senmon Iinkai, Hyokain, 2003-2006
17. Ph. D. committee member of Mr. Masahiko Yoshinaga (RIMS, Kyoto Univ., Feb., 2004)
18. JSPS Kagaku Kenkyuuhi Iinkai Senmon Iin, 2004
19. Organizer of Introductory Workshop in Hyperplane Arrangements and Applications at MSRI, Berkeley, CA, USA, August 23, 2004 to August 27, 2004
20. Organizer of Topology of Arrangements and Applications at MSRI, Berkeley, CA, USA, Oct 4-8, 2004
21. Organizer of Periods -Around the Theory of Primitive Forms-, In Honor of Professor Kyoji Saito on his Sixtieth Birthday, at Research Institute for Mathematical Sciences (RIMS) Kyoto University, January 22 - 26, 2005
22. Organizer of Workshop of Recent Developments of Arrangements and Configuration Spaces at MSRI, Berkeley, CA, USA, Aug 7-11, 2006
23. Kokusai Kooryuu Tantou Senmon Iin, Math. Soc. Japan, 2006 -
24. Organizing Committee Chair of The Second MSJ Seasonal Institute, Arrangements of Hyperplanes, August 1 - 13, 2009 (62 participants from overseas, 179 in total)
25. JSPS Research Center for Science Systems (Nihon Gakujutsu Shinkokai Gakujutsu System Kenkyu Center), Program Officer (Senmon Kenkyuuin), April 1, 2010 - Mar. 31, 2011
26. JSPS Research Center for Science Systems (Nihon Gakujutsu Shinkokai Gakujutsu System Kenkyu Center), Senior Program Officer (Shunin Kenkyuuin), April 1, 2011 -
27. MSJ Science Committee Member (Gakujutsu Iinkai Un-ei Iin) October, 2009 - (Chair, July, 2011 - )

PhD student:

1. Keith Brandt, 1992
2. Lee Ki-Suk, 1995

Scholarships and Grants:

1. Japan Ikueikai Scholarship Apr. 1974-Mar. 1977
2. Scientific Research Grant Ministry of Education (Shorei-Kenkyu A) 1980
3. JMS Research Fellow  
(Harvard Committee on the Education Project for Japanese  
Mathematical Scientists) 1982-83
4. NSF Grant (Summer) 1983
5. Scientific Research Grant, Ministry of Education (Shorei-Kenkyu A) 1986
6. NSF Grant 144 BP55 (3 yrs. from July, 1990, extended until August 31,  
1994) (co-principal investigator) with Peter Orlik
7. UW Graduate School # 911655 (2 yrs. from July, 1990, extended until  
June 30, 1994)
8. NSF Grant 144-EY53 (3 yrs. from July, 1995) (co-principal investigator)  
with Peter Orlik
9. Scientific Research Grant, Ministry of Education (Kiban B) 1997 (2 yrs.  
from April, 1997)
10. Scientific Research Grant, Ministry of Education (Kiban B) 1999 (3 yrs.  
from April, 1999)
11. Scientific Research Grant, Ministry of Education (Houga) 2001 (3 yrs.  
from April, 2001)
12. Scientific Research Grant, Ministry of Education (Kiban B) 2002 (3 yrs.  
from April, 2002)
13. Research Grant (selected by Dean), Tokyo Metropolitan University, 2002
14. Research Grant (selected by Chancellor), Tokyo Metropolitan University,  
2003
15. Scientific Research Grant, Ministry of Education (Kiban B) 2005 (4 yrs.  
from April, 2005)
16. Scientific Research Grant, Ministry of Education (Houga) 2006 (3 yrs.  
from April, 2006)
17. Scientific Research Grant, Ministry of Education (Kiban B) 2009 (3 yrs.  
from April, 2009)

## Professional Publications

### A. Books

1. Arrangements of Hyperplanes. (xviii + pp.325) Grundlehren der mathematischen Wissenschaften **300**, Springer-Verlag, Berlin-Heidelberg-New York, 1992. (P. Orlik, H. Terao)
2. Arrangements-Tokyo 1998. Advanced Studies in Pure Math. **27**, Kinokuniya, Tokyo, 2000. (eds. M. Falk and H. Terao)

### B. Papers (refereed)

1. Forms with logarithmic pole and the filtration by the order of the pole. Proc. Intern. Sympo. on Algebraic Geometry, Kyoto, 1977, Kinokuniya, Tokyo, 1978, 673-685. [82b:14004]
2. The rational forms on the weighted projective space and the filtration by the order of pole. Sci. Papers of the Coll. of Gen. Ed., Univ. of Tokyo 28, no.2, 153-158 (1978).[MR 80i:14006]
3. Arrangements of hyperplanes and their freeness I. J. Fac. Sci. Univ. Tokyo Sect. IA Math. 27, 293-312 (1980). [MR 84i:32016a]
4. Arrangements of hyperplanes and their freeness II -the Coxeter equality-. J. Fac. Sci. Univ. Tokyo Sect. IA Math. 27, 313-320(1980). [MR 84i:32016b]
5. Free arrangements and unitary reflection groups. Proc. Japan Acad. 56(8)A, 389-392 (1980). [MR 82e:32018a]
6. Generalized exponents of a free arrangement of hyperplanes and Shephard-Todd-Brieskorn formula. Inventiones math. 63, no.1, 159-179 (1981). [MR 82e:32018b]
7. On Betti numbers of complement of hyperplanes. Publ. RIMS 17, no.2, 657-663 (1981). [MR 83h:32012]
8. The exponents of a free hypersurface. Proc. Symp. Pure Math. 40, *Singularities*, part 2, 561-566 (1983). [MR 85a:32012]
9. The bifurcation set and logarithmic vector fields. Math. Ann. 263, no.3, 313-321 (1983). [MR 85a:32030]
10. Les treilles hypersolvables et les arrangements des hyperplans libres. C. R. Acad. Sci. Paris 296, Ser.I, 623-624 (1983). [MR 85a:32020] (M. Jambu, H.Terao)
11. Free arrangements of hyperplanes over an arbitrary field. Proc. Japan Acad. 59A, 301-303 (1983). [MR 85f:32017]

12. Discriminant of a holomorphic map and logarithmic vector fields. *J. Fac. Sci. Univ. of Tokyo Sect. IA Math.* **30**, 379-391 (1983). [MR 85d:32027]
13. Free arrangements of hyperplanes and supersolvable lattices. *Advances in Math.* **52**, no.3, 248-258 (1984) (M. Jambu, H. Terao) [MR 86c:32004]
14. The duality of the exponents of free deformations associated with unitary reflection groups. *Advanced Studies in Pure Math.* **6**, *Algebraic Groups and Related Topics*, Kinokuniya and North-Holland, Tokyo-Amsterdam, 1984, 347-359. [MR 87a:32023] (H. Terao, T. Yano)
15. Arrangements of hyperplanes and differential forms. *Contemporary Math.*, **34**, Amer. Math. Soc., Providence, R.I., 1984, 29-65 (P. Orlik, L. Solomon, H. Terao) [MR 86m:32018]
16. On the Coxeter arrangement and the Coxeter number. *Advanced Studies in Pure Math.* **8**, *Complex Analytic Singularities*, Kinokuniya and North-Holland, Tokyo-Amsterdam, 1986, 461-477. [MR 88g:32020] (P. Orlik, L. Solomon, H. Terao)
17. Modular elements of lattices and topological fibration. *Advances in Math.* **62**, no.2, 133-154 (1986).
18. A formula for the characteristic polynomial of an arrangement. *Advances in Math.* **64**, no.3, 305-325 (1987). (L. Solomon, H. Terao) [MR 88m:32022]
19. Arrangements of hyperplanes and broken-circuits. *Contemporary Math.* **90**, Amer. Math. Soc., Providence, R.I., 1989, 147-162. (M. Jambu, H. Terao)
20. Basic derivations for  $G_{34}$  : Appendix to "Basic derivations for unitary reflection groups" by P. Orlik. *Contemporary Math.* **90**, Amer. Math. Soc., Providence, R.I., 1989, 225-227. (H.Terao, Y.Enta)
21. The Jacobians and the discriminants of finite reflection groups. *Tohoku Math. J.* **41**, no. 2, 237-247 (1989)
22. On a Certain Invariant of a Finite Unitary Reflection Group. *Proc. Japan Acad.*, **65**, Ser. A, 320-322, (1989)
23. Hilbert polynomials and geometric lattices. *Advances in Math.* **84**, no.2, 209-225 (1990) (L. Rose, H.Terao)
24. A free resolution of the module of logarithmic forms of a generic arrangement. *J. of Algebra*, **136**, no.2, 376-400 (1991) (L. Rose, H.Terao) [MR 93h:32048]
25. Factorizations of the Orlik-Solomon Algebras. *Advances in Math.* **91**, no.1, 45-53 (1992)

26. Coxeter arrangements are hereditarily free. *Tohoku Math. J.*, **45**, no. 3, 369-383 (1993) (P. Orlik, H. Terao)
27. Free arrangements and relation spaces. *Discrete Comput. Geom.* **12**, 49-63 (1994) (K. Brandt, H. Terao)
28. Commutative algebras for arrangements. *Nagoya J. of Math.*, **134**, 65-73 (1994) (P. Orlik, H. Terao)
29. Arrangements and Milnor fibers. *Math. Ann.*, **301**, 211-235 (1995) (P. Orlik, H. Terao)
30. Logarithmic forms on affine arrangements. *Nagoya J. of Math.*, **139**, 129-149, (1995) (H. Terao, S. Yuzvinsky)
31. The number of critical points of a product of powers of linear functions. *Inventiones Math.*, **120**, 1-14 (1995) (P. Orlik, H. Terao)
32. Local systems on complements of hyperplanes and the Kac-Kazhdan conditions for singular vectors. *J. Pure and Applied Alg., Physics and Algebra*, 93-102 (1995) (V. Schechtman, H. Terao, A. Varchenko)
33. The logarithmic forms of  $k$ -generic arrangements. *J. Math. Sci. Univ. of Tokyo*, **3**, 83-89 (1996) (K.-S. Lee, H. Terao)
34.  $\beta$ **nb**c-bases for local system cohomology on hyperplane complements. *Transactions AMS*, **349**, 189-202 (1997) (M. Falk, H. Terao)
35. The determinant of a hypergeometric period matrix. *Inventiones Math.*, **128**, 417-436 (1997) (A. Douai, H. Terao)
36. Twisted de Rham cohomology groups of logarithmic forms. *Advances in Math.*, **128**, 119-152 (1997) (K. Aomoto, M. Kita, P. Orlik, H. Terao)
37. The double Coxeter arrangements. *Comment. Math. Helv.*, **73**, 237-258 (1998) (L. Solomon, H. Terao)
38. Logarithmic forms and anti-invariant forms of reflection groups. In *Advanced Studies in Pure Math.* **27**, 273-278, *Arrangements-Tokyo 1998* (eds. M. Falk and H. Terao), Kinokuniya, Tokyo, 2000. (A. Shepler, H. Terao)
39. Arrangements and hypergeometric integrals. *JMS Memoir*, **9**, (vi+112pp.), 2001/2007(second edition), Japan Mathematical Society (P. Orlik, H. Terao)
40. Moduli space of combinatorially equivalent arrangements of hyperplanes and logarithmic Gauss-Manin connections. *Topology and its appl.*, **118**, 255-274 (2002)

41. Multiderivations of Coxeter arrangements. *Inventiones Math.*, **148**, 659–674 (2002)
42. Algebras generated by reciprocals of linear forms. *J. of Algebra*, **250**, 549–558 (2002)
43. The Poincaré series of the algebra of rational functions which are regular outside hyperplanes. *J. of Algebra*, **266**, 169–179 (2003) (H. Horiuchi, H. Terao)
44. Bases of the contact-order filtration of derivations of Coxeter arrangements. *Proc. AMS*, **133**, 2029–2034 (2005)
45. The Hodge filtration and the contact-order filtration of derivations of Coxeter arrangements. *Manuscripta Math.*, **118**, 1–9 (2005)
46. Arrangements and Ranking Patterns. *Annals of Combinatorics*, **10**, 219–235 (2006) (H. Kamiya, P. Orlik, A. Takemura, H. Terao)
47. Chambers of arrangements of hyperplanes and Arrow’s impossibility theorem. *Advances in Math.*, **214**, 366–378 (2007)
48. The characteristic polynomial of a multiarrangement. *Advances in Math.*, **215**, 825–838 (2007) (T. Abe, H. Terao, M. Wakefield)
49. The Euler multiplicity and addition-deletion theorems for multiarrangements. *J. London Math. Soc.*, (2) **77**, 335–348 (2008) (T. Abe, H. Terao, M. Wakefield)
50. A correction to “Bases of the contact-order filtration of derivations of Coxeter arrangements.” *Proc. Amer. Math. Soc.* **136**, 2639–2639 (2008)
51. Periodicity of hyperplane arrangements with integral coefficients modulo positive integers. *J. Alg. Combin.* **27**, 317–330 (2008) (H. Kamiya, A. Takemura, H. Terao)
52. Totally free arrangements. *Proc. Amer. Math. Soc.* **137**, 1405–1410 (2009) (T. Abe, H. Terao, M. Yoshinaga)
53. The characteristic quasi-polynomials of the arrangements of root systems and mid-hyperplane arrangements. *Progress in Math.* **283**, *Arrangements, local systems and singularities*, Lecture Notes of a 2007 CIMPA Summer School held at Galatasaray University (Istanbul), Jun. 11–22, 2007 (ed. F. Elzein, A. Suciu, M. Tosun, A. M. Uludag, S. Yuzvinsky), Birkhäuser, 177–190, 2010 (H. Kamiya, A. Takemura, H. Terao)
54. A primitive derivation and logarithmic differential forms of Coxeter arrangements. *Math. Z.* **264**, 813–828 (2010) (A. Abe, H. Terao)

55. Primitive filtrations of the modules of invariant logarithmic forms of Coxeter arrangements. *Journal of Algebra*, **330**, 251-262 (2011) (T. Abe, H. Terao)
56. Ranking patterns of unfolding models of codimension one. *Advances in Applied Mathematics*, **47**, 379-400 (2011) (H. Kamiya, A. Takemura, H. Terao)
57. The freeness of Shi-Catalan arrangements. *European J. Combin.* **32**, 1191-1198 (2011) (T. Abe, H. Terao)
58. Periodicity of non-central integral arrangements modulo positive integers. *Annals of Combinatorics*, **15**, 449-464 (2011) (H. Kamiya, A. Takemura, H. Terao)
59. The Shi arrangements and the Bernoulli polynomials. (arXiv:1103.3214) *Bull. London Math. Soc.* (to appear) (D. Suyama, H. Terao)
60. Arrangements stable under the Coxeter groups. (arXiv:1103.5179) in: "Configuration Spaces: Geometry, Topology and Combinatorics," Proceedings of a special period at the De Giorgi Center, Scuola Normale in Pisa, May - June, 2010, Birkhauser (to appear) (H. Kamiya, A. Takemura, H. Terao)
61. Equivariant multiplicities of Coxeter arrangements and invariant bases. (arXiv:1011.0329v3) preprint (T. Abe, H. Terao, A. Wakamiko)
62. The Shi arrangement of the type  $D_\ell$ . (arXiv:1109.1381) preprint (R. Gao, D. Pei, H. Terao)
63. Simple-root bases for Shi arrangements. (arXiv:1111.3510) preprint (T. Abe, H. Terao)

C. Papers (non-refereed)

1. Logarithmic forms and cohomology of complement of hypersurfaces (Master thesis).
2. Fukuso shaei kuukanjoo no yuuri bibun keishiki no nasu fukutai ni tsuite. *Kyoodai suuriken kookyuroku* 273, 151-163 (1976).
3. On the logarithmic differentials. *Kyoodai suuriken kookyuroku* 281, 177-195 (1976).
4. Logarithmic vector fields and a generalized Coxeter equality. *Kyoodai suuriken kookyuroku* 387, 29-37 (1980).
5. New exponents and Betti numbers of complement of hyperplanes. *Kyoodai suuriken kookyuroku* 415, 177-195 (1981).

6. On the exponents of a free divisor. Lecture Note for AMS Summer Institute S3-HT-1-7, (1981).
7. The discriminant and the bifurcation set, Kyoodai suuriken kookyuroku 474, 88-97 (1983).
8. The bifurcation set and logarithmic vector fields. Abstracts Amer. Math. Soc. 4, no.3, 236 (1983)
9. Arrangement no tokusei takousiki to logarithmic multi vector fields. Kyoodai suuriken kookyuroku 595, 13-20 (1986).
10. A remark on the Jacobian of the basic invariants of a reflection group. (Japanese) Kyoodai suuriken kookyuroku 634, 18-24 (1987).
11. Reflection groups, combinatorics, and multi-derivations. (Introduction and references) Kyoodai suuriken kookyuroku 634, 25-39 (1987).
12. Hyperplane arrangements and reflection groups. Report on the XXth Ohio State-Denison Mathematics Conference. The Ohio State University, 1988.
13. Chou-Heimen Haichi to Chou-Kika Sekibun. (Japanese) Daisuu Kika Kinosaki Symposium Kiroku, 1-9 (1998).
14. Edelman-Reiner yosou no kaiketsu ni tsuite. (Japanese) Proceedings of the sixth symposium on representatios of algebraic groups and quantum groups, 101-110 (2003).
15. Hyperplane arrangements and statistics. (Japanese) Proceedings of the forty-eighth symposium on algebra, 69-77 (2003).
16. Ranking Patterns of the Unfolding Model and Arrangements. Proceedings of the annual meeting of Japan Statistitcal Society, 2003 (to appear) (H. Kamiya, P. Orlik, A. Takemura, H. Terao)

#### D. Reviews

132 reviews on Mathematical Reviews

#### E. Other Publications

1. Chuugoku no amari (Chinese Remainder) (Japanese) Daigaku e no suugaku, Tokyo Shuppan, Apr., 1989, 74-77.
2. Daireikai Shaeiheimen (Spiritual Projective Space) (Japanese) Daigaku e no suugaku, Tokyo Shuppan, June, 1989, 52-55.

3. Kitei, Jigen, Kaisuu ni tsuite no Taiwa (A Dialog on Basis, Dimension, and Rank) (Japanese) Suugaku Seminar, Nihon Hyooron Sha, Oct., 1989, 54-57.
4. 3-geimu to Chikan (The 3-Game and Permutations) (Japanese) Daigaku e no suugaku, Tokyo Shuppan, Oct., 1989, 54-57.
5. Kakko no Tsukekata Koza(How to Put Parentheses) (Japanese) Daigaku e no suugaku, Tokyo Shuppan, Jan., 1990, 52-55.
6. Nichibei Sansuu Masatsu?(Japan-US Arithmetics Friction?) (Japanese) Daigaku e no suugaku, Tokyo Shuppan, Mar., 1990, 64-67.
7. Möbius no Hanten(The Möbius Inversion) (Japanese) Daigaku e no suugaku, Tokyo Shuppan, May, 1990, 74-77.
8. Kagami no Kuni to 2-ji Houteishiki (The Land of Mirrors and Quadratic Equations) (Japanese) Daigaku e no suugaku, Tokyo Shuppan, August, 1990, 54-57.
9. Fooko in USA. (chromatic polynomials I) (Japanese) Daigaku e no suugaku, Tokyo Shuppan, December, 1990, 54-57.
10. Fooko in USA. II (chromatic polynomials II) (Japanese) Daigaku e no suugaku, Tokyo Shuppan, March, 1991, 54-57.
11. Let's Make a Deal at Disney World (Japanese) Daigaku e no suugaku, Tokyo Shuppan, June, 1991, 58-61.
12. Palindromes and orbits (Japanese) Daigaku e no suugaku, Tokyo Shuppan, Oct., 1991, 58-61.
13. Combinatorics of Arrangements of Hyperplanes (Japanese) Suuri-Kagaku, Saiensu-sha, Jul., 1995, 29-33.
14. Pros and cons: Lives of math professors in the USA (Japanese) Suugaku Seminar, Nihon Hyooron Sha, July, 1998, 2-6.
15. Between finiteness and infiniteness. (a discussion among Toshitake Kohno, Kyoji Saito, and Hiroaki Terao) (Japanese) Suugaku Seminar, Nihon Hyooron Sha, August, 1998, 30-35.
16. Limits in high schools, topology in colleges (Japanese) Suugaku Seminar, Nihon Hyooron Sha, April, 2000, 51-55 =In: "Daigaku de dono you na suugaku wo manabu ka," Nihon Hyooron Sha, Jan. 2002.
17. Yamato Nadeshiko to Rikei Banare (Japanese) Suugaku Seminar, Nihon Hyooron Sha, June, 2001, 1.
18. What are the invariants? (Fuhenryou to wa nani ka?) (Japanese) Bluebacks 1393, Kodansha, Nov, 2002, 246pp. (J. Imai, H. Terao, H. Nakamura)

19. Hyperplane arrangements and singularities (Chou Heimen Haichi to Tokuiten) (Japanese) Suugaku no Tanoshimi, Nihon Hyooron Sha, Nov. 2005, 65–79
20. Linear Algebra - Lectures and Exercises (Senkei Daisuu - Kougi to Enshuu) (Japanese) Baifuukan, Apr., 2007, 171pp. (M. Kobayashi, H. Terao)
21. On the study how to promote mathematics research to create innovations (Innovation souchutsu no tame no suugaku kenkyuu no chousa ni tsuite) (Japanese), Suugaku Seminar, Nihon Hyooron Sha, August, 2008, 46-49.
22. On the Catalan numbers -Mathematics Live 2009, a lecture for high school students at Hokkaido University- (Japanese), Suugaku Seminar, Nihon Hyooron Sha, August, 2009, 8-12.

Talks (1983-)

1. The bifurcation set and logarithmic vector fields. Special session of singularities of algebraic and analytic geometry, the 803rd Meeting of AMS, at New York, NY, Apr. 14, 1983.
2. Free arrangement of hyperplanes over  $K$ . AMS 1983 Summer Research Conference Series, Combinatorics and algebra at Boulder, Col., June 7, 1983.
3. The Coxeter arrangements and the Coxeter number. Sympo. on algebraic groups and invariants at Nagoya, Oct. 11, 1983.
4. Arrangements of hyperplanes and differential forms. U.S.-Japan seminar on singularities in Tsukuba, July 20, 1984.
5. The lattice and topology of arrangements. Sympo. on complex analytic singularity at Tokyo Metropolitan Univ., Dec. 6, 1984.
6. The arrangements of hyperplanes - A survey I, II - Semester on Singularities at Banach Center, Warsaw, Apr. 1, 2, 1985.
7. New formula for the characteristic polynomial of an arrangement. Sympo. on complex analytic singularities at RIMS, Kyoto Univ., Dec. 2, 1985.
8. A new formula for the characteristic polynomial of an arrangement. Intern. Conference on Singularities at Univ. of Iowa, Jul. 31, 1986.
9. Reflection groups, combinatorics and multi derivations. Sympo. on problems in analytic varieties and stratified spaces at RIMS, Kyoto Univ., Oct. 22, 1986.
10. Mathematics on Families of Hyperplanes. Special Lecture at Annual Meeting of Japan Mathematical Society at University of Tokyo, Komaba, Apr. 1, 1987.
11. Arrangement of hyperplanes and reflection groups. Colloquium at University of Wisconsin, Jan., 1988.
12. Hyperplane arrangements and reflection groups. The XXth Ohio State-Denison Conference at Denison University, Ohio, USA, Feb. 27, 1988.
13. Combinatorics of hyperplane arrangements. Colloquium of MIT, Harvard, and Brandeis Univ., Cambridge, MA, Mar. 10, 1988.
14. Arrangement of hyperplanes and reflection groups. At Combinatorics Semi. at MIT., Cambridge, MA, Mar. 11, 1988.

15. Discriminants and arrangements of hyperplanes. Colloquium at University of Iowa, July 26, 1988.
16. On the Jacobian ideal of a hyperplane arrangement. Special MSI lecture at Cornell University, NY, July 29, 1988.
17. On a free resolution of a Jacobian ideal. RIMS, Kyoto University, Aug. 18, 1988.
18. On free resolutions of the modules of logarithmic forms. Symposium on Singularities, Hokkaido University, Jan. 26, 1989.
19. An algebraic study of arrangements of hyperplanes. Combinatorics and Geometry, Stockholm, (invited talk), Aug. 10, 1989.
20. An algebraic study of arrangements of hyperplanes, Symposium on Singularities and related topics, Yokohama National Univ., Sept. 6, 1989.
21. Finite unitary reflection groups and the Coxeter number, Sympo. on complex analytic geometry and related topics at RIMS, Kyoto Univ., Dec. 6, 1989.
22. Mathematics of Families of Hyperplanes - Its Past, Present and Future-, Sympo. on combinatorics and related topics at RIMS, Kyoto Univ., Mar. 16, 1990.
23. On the Free Arrangements I, II . Sympo. on combinatorics and geometry at RIMS, Kyoto Univ., Mar. 19, 20, 1990.
24. Arrangements of Hyperplanes and Graded Algebras. ICM-90 satellite conference on Commutative Algebra and Combinatorics. Nagoya, Japan. August 15-19, 1990.
25. Arrangements of Hyperplanes and Graded Algebras. Colloquium at Northern Arizona Univ., Flagstaff, Arizona. March 26, 1991.
26. Finite Reflection Groups and the Coxeter Numbers. Colloquium at University of Arizona, Tucson, Arizona. March 28, 1991.
27. Finite Reflection Groups and the Coxeter Numbers. Colloquium at University of Wisconsin, Madison, Wisconsin. April 26, 1991.
28. Finite Reflection Groups and the Coxeter Numbers. Combinatorics Seminar at MIT, Cambridge, Massachusetts. May 29, 1991.
29. Relation Spaces of Free Arrangements of Hyperplanes. Sympo. on period maps at RIMS, Kyoto Univ., Aug. 7, 1991.
30. On the Arrangement Divisor of Hyperplanes. Colloquium at Tokyo Metropolitan University, Tokyo, Japan. Aug. 12, 1991.

31. Arrangements. Invited one-hour lecture at College of Singularities at International Centre for Theoretical Physics at Trieste, Italy, Aug. 19, 1991.
32. Coxeter Arrangements Are Hereditarily Free. Mittag-Leffler Institute, Stockholm, May 20, 1992.
33. Coxeter Arrangements Are Hereditarily Free. Colloquium at Tokyo Metropolitan University, Tokyo, Japan. June 11, 1992.
34. Coxeter Arrangements Are Hereditarily Free. Colloquium at Tokyo Institute of Technology, Tokyo, Japan. June 22, 1992.
35. Arrangements of Hyperplanes and Reflection Groups. Sympo. on Algebraic Combinatorics, Gifu, Japan. June 29, 1992.
36. Algebraic Study of Hyperplane Arrangements. Invited one-hour lecture at NSF Regional Geometry Institute, Amherst, Massachusetts. July 20, 1992.
37. Arrangements, logarithmic forms, and Milnor fibers. Colloquium at University of Illinois at Chicago, Apr. 14, 1993.
38. Logarithmic forms, arrangements, and Milnor fibers. Invited one-hour lecture at International Geometry Colloquium, Moscow, Russia, May 12, 1993.
39. Milnor fibers and arrangements. Algebraic geometry seminar, Nagoya University, Japan, June 14, 1993.
40. Twisted de Rham complexes of logarithmic differential forms and arrangements of hyperplanes. Colloquium at University of North Carolina, Chapel Hill, NC, April 15, 1994.
41. Twisted de Rham complexes of logarithmic differential forms and arrangements of hyperplanes. Topology Seminar at Université de Bourgogne, Dijon, France, June 16, 1994.
42. Twisted de Rham complexes of logarithmic differential forms and arrangements of hyperplanes. Colloquium at University of Essen, Essen, Germany, June 22, 1994.
43. The number of critical points of a product of powers of linear functions. Algebraic Geometry Seminar at University of Essen, Essen, Germany, June 22, 1994.
44. Twisted de Rham complexes of logarithmic differential forms and arrangements of hyperplanes. (invited 75 minutes talk) Conference on Arrangements of Hyperplanes at CIRM, Luminy, France, July 5, 1994.

45. Folkman complexes and local system cohomology. Combinatorics Seminar at IAS, Princeton, NJ, Dec 5, 1994.
46. Combinatorics and the cohomology of a local system on the complement of hyperplanes. Symposium on Complex Geometry at Tokyo Metropolitan University, Jan 9, 1995.
47. Combinatorics and arrangements of hyperplanes. Special colloquium at Nagoya University, Jan 11, 1995.
48. Combinatorics and arrangements of hyperplanes. A series of talks (4 hours in total) at Workshop on arrangements of hyperplanes and related subjects at University of Tokyo, Jan 17 - 19, 1995.
49. Cohomology of local systems, arrangements of hyperplanes, and hypergeometric functions. Colloquium at University of Oregon, Eugene, Oregon, May 1, 1995.
50. Arrangements and Milnor fibers. Université d'Angers, France, June 3, 1995.
51. Local system cohomology, arrangements of hyperplanes, and hypergeometric functions. Colloquium at Michigan State University, Dec. 7, 1995
52. Arrangements of hyperplanes and hypergeometric  $\beta$ -period matrices. Invited one-hour talk at a Special Session of AMS Meeting, University of Iowa, Mar. 21, 1996
53. Arrangements of hyperplanes and hypergeometric  $\beta$ -determinants. Invited 50-minute talk at a Conference on Algebraic Combinatorics, Hokkaido University, July 3, 1996
54. Arrangements of hyperplanes and hypergeometric  $\beta$ -determinants. Workshop on Arrangements of Hyperplanes and Hypergeometric Systems, University of Tokyo, Two 60-minute talks, July 8, 9, 1996
55. The determinant of period matrix for a real arrangement of hyperplanes. Colloquium at SUNY at Stony Brook, March 6, 1997
56. The determinant of period matrix for a real arrangement of hyperplanes. Discrete Mathematics Seminar at UC Berkeley, March 10, 1997
57. Double Coxeter arrangements. Colloquium at Tohoku University, May 19, 1997
58. Double Coxeter arrangements. Colloquium at Kyushu University, June 18, 1997

59. Hyperplane arrangements and hypergeometric functions. three invited 90 minute talks at Tahensuu Kansuu-ron (Function theory of several variables) Summer Seminar at Iko no mura Wakayama, Susami, Wakayama, July 17, 18, 1997
60. Hyperplane arrangements and hypergeometric integrals - an introduction -, Workshop on Real and Complex Singularities, Kagoshima Univ., Oct. 16, 1997.
61. Hyperplane arrangements and hypergeometric functions. Minifestival for algebraic geometry, GARC, Seoul National University, Seoul, Korea, Oct. 31, 1997
62. Hyperplane arrangements and hypergeometric functions. Combinatorial representation theory and representation-theoretic combinatorics, RIMS, Kyoto University, Nov. 3, 7, 1997
63. Hyperplane arrangements and hypergeometric functions. Algebraic geometry symposium, Kinosaki Nov. 11, 1997
64. Hypergeometric period matrices. Colloquium at Saitama University, Nov. 28, 1997
65. On the connection associated of a family of arrangements. Algebraic Geometry/Geometry Seminar at Nagoya University, Jan. 13, 1998
66. On the connection associated of a family of arrangements. Colloquium at Kanazawa University, Feb. 4, 1998
67. On Combinatorial Aspects of the Hypergeometric Function Theory. special one-hour lecture at MSJ Annual Meeting, Meijo University, Nagoya, March 29, 1998
68. Hyperplane arrangements and hypergeometric functions. Colloquium at Tokyo Metropolitan University, May 28, 1998
69. Antiinvariant differential forms and logarithmic differential forms of Coxeter arrangements, Workshop on mathematics related to arrangements of hyperplanes (invited one-hour talk), Tokyo Metropolitan University, July 14, 1998
70. Hyperplane arrangements and hypergeometric functions, Colloquium at Computer Science Department, University of Tokyo, March 10, 1999
71. Arrangements of hyperplanes - an introduction and applications -, Topology Seminar at University of Tokyo, June 1, 1999
72. Flat connections arising from a family of arrangements, "Arrangements in Boston" A Conference on Hyperplane Arrangements, Northeastern University, Boston, June 15, 1999

73. Flat connections arising from a family of arrangements, “International Workshop on Physics and Combinatorics,” Nagoya University, August 27, 1999
74. Moduli spaces of arrangements and their combinatorial properties, Combinatorics Seminar, MIT, Cambridge, MA, USA, Sep. 1, 1999
75. Introduction to arrangements of hyperplanes, Encounter with Mathematics “Mathematics related to arrangements of hyperplanes,” Chuo University, Tokyo, Oct. 22, 23, 1999
76. Arrangements of hyperplanes and hypergeometric functions, Colloquium, Hanoi Institute of Mathematics, Dec. 24, 1999
77. Double Coxeter arrangements, the Shi arrangements, anti-invariant forms and logarithmic forms, “Combinatorics of Lie type,” University of Wisconsin, Madison, WI, USA, June 20, 2000
78. The Shi arrangements and double derivations, “Combinatorics and Physics,” Nagoya University, August 23, 2000
79. The Shi arrangements and double derivations, Northern Arizona University, September 1, 2000
80. The Shi arrangements and double derivations, Texas A & M University, September 6, 2000
81. The Shi arrangements and double derivations, Millican Lecture, Colloquium, University of North Texas, September 8, 2000
82. Multiderivations of Coxeter arrangements, Workshop and special session on arrangements of hyperplanes, Columbia University, November 3, 2000
83. Multiderivations of Coxeter arrangements, Workshop on arrangements, ETH, Zurich, December 6, 2000
84. Algebras generated by reciprocals of linear forms, Colloquium, Okayama University, June 13, 2001
85. Algebras generated by reciprocals of linear forms, The international symposium on singularity theory and their applications I, Beijing University of Chemical Technology, China, July 6, 2001
86. Multiderivations of Coxeter arrangements, International workshop on integral models, combinatorics and representation theory, RIMS, Kyoto, August 12, 2001
87. Moduli space of combinatorially equivalent arrangements of hyperplanes and logarithmic Gauss-Manin connections, three one-hour talks at Conference on arrangements of hyperplanes at Univ. Nice, Sep. 28, 29, 2001

88. Reflection groups and primitive derivative. special one-hour lecture at MSJ Annual Fall Meeting, Kyushu University, Fukuoka, Oct. 4, 2001
89. Algebras generated by reciprocals of linear forms, special session on algebraic and topological combinatorics, Williams College, Williamstown, MA, USA, Oct. 13, 2001
90. Geometry of the orbit spaces of reflection groups and reflection arrangements. Colloquium, Sophia University, Tokyo, Dec. 10, 2001
91. Reflection groups, primitive derivations and geometry of the orbit space. one-hour invited address at a NSF-CBMS conference "Arrangements and mathematical physics," Louisiana State University, Baton Rouge, LA, USA, Jan. 14, 2002
92. Poincaré series of rational functions with poles on hyperplanes, Workshop on generating functions, Hokkaido Univ., Sapporo, Jan. 23, 2002
93. Poincaré series of rational functions which are regular outside hyperplanes, Miniworkshop on cohomology jumping loci, Oberwolfach, Germany, Mar. 5, 2002
94. The Hodge filtration and the contact-order filtration of derivations of Coxeter arrangements, (an invited 50 minute talk), Workshop on Frobenius manifolds, quantum cohomology, and singularities, MPI, Bonn, Germany, July 16, 2002
95. Multiderivations of Coxeter arrangements and the geometry of the orbit spaces, special session on arrangements of hyperplanes, Univ. Wisconsin, Madison, WI, USA, Oct. 12, 2002
96. Coxeter arrangements and derivation modules. Lie algebra seminar, Univ. Wisconsin, Madison, WI, USA, Dec. 3, 2002
97. On the vector fields tangent to a reflection arrangement. Contact structures, singularities and related topics, Kure, Hiroshima, Japan, January 30, 2003
98. Introduction to hyperplane arrangements, Department of Mathematical Informatics, University of Tokyo, Feb. 21, 2003
99. Some combinatorial properties of the root systems, The sixth symposium on representations of algebraic groups and quantum groups, Karuizawa, Japan, June 20-22, 2003
100. Hyperplane arrangements and statistics, Algebra symposium, Nagoya, Japan, August 5, 2003
101. Root systems, vector fields and geometry of orbit spaces, Mathematical Society of Japan, 12th International Research Institute, Singularity Theory and Its Applications, Sapporo, Japan, September 22, 2003

102. On the Edelman-Reiner conjecture and a new criterion for arrangements to be free, American Mathematical Society, Annual Meeting, special session on combinatorics and geometry, Phoenix Civic Center, Phoenix, AZ, USA, Jan. 8, 2004
103. Free arrangements of hyperplanes (a survey), MSRI, Berkeley, CA, USA, Aug. 23, 2004
104. Hypergeometric integrals and arrangements of hyperplanes (an introduction using the classical examples), MSRI, Berkeley, CA, USA, Aug. 24, 2004
105. Free arrangements of hyperplanes, Combinatorics seminar, UC Davis, CA, USA, Oct. 23, 2004
106. On the multi-free arrangements MSRI, Berkeley, CA, USA, Nov. 5, 2004
107. Commutative rings arising from arrangements of hyperplanes  
Commutative algebra and algebraic geometry seminar UC Berkeley, CA, USA, Nov. 9, 2004
108. What makes arrangements free? Colloquium, Northern Texas Univ., TX, USA, Dec. 14, 2004
109. Free arrangements of hyperplanes, Periods -Around the Theory of Primitive Forms- In Honor of Professor Kyoji Saito on his Sixtieth Birthday, Research Institute for Mathematical Sciences (RIMS) Kyoto University, January 26, 2005
110. Arrangements of hyperplanes and hypergeometric integrals, Applications of singularities workshop at CIRM, Marseille Luminy, February 7, 2005
111. What makes arrangements free? Euroconferences in Mathematics on Crete, Algebraic and Geometric Combinatorics, Anogia, Greece, August 21, 2005
112. Introduction to hyperplane arrangements - Especially on free arrangements - Recent topics on real and complex singularities, Research Institute for Mathematical Sciences (RIMS) Kyoto University, Nov. 28, 2005
113. Multiderivations of Coxeter Arrangements of Type  $B_\ell$  and Primitive Derivations, Colloquium, Northern Arizona University, Feb. 17, 2006
114. Various phases of arrangements of hyperplanes, Colloquium, Hokkaido University, April 28, 2006
115. Multiderivations of real reflection arrangements, The international symposium on singularity theory and their applications II, Beijing University of Chemical Technology, China, May 10, 2006

116. Multiderivations of Coxeter Arrangements of Type  $B_\ell$  and Primitive Derivations, Geometry and Analysis on Complex Algebraic Varieties, Joint RFBR-JSPS Symposium, Moscow Independent University, Aug. 17, 2006
117. Chambers of arrangements of hyperplanes and Arrow's impossibility theorem, Development of Computational Algebraic Statistics, Research Institute for Mathematical Sciences (RIMS) Kyoto University, Nov. 8, 2006
118. Chambers of arrangements of hyperplanes and Arrow's impossibility theorem, Colloquium, Okayama University, Nov. 9, 2006
119. Basic properties of multiarrangements, Geometry and analysis on complex varieties, Research Institute for Mathematical Sciences (RIMS) Kyoto University, Dec. 13, 2006
120. Chambers of arrangements of hyperplanes and Arrow's impossibility theorem, American Mathematical Society, Annual Meeting, special session on Arrangements and Related Topics, New Orleans Sheraton, New Orleans, LA, USA, Jan. 6, 2007
121. Chambers of arrangements of hyperplanes and Arrow's impossibility theorem, Braids and their Ramifications - Configuration Spaces, Arrangements, Mapping, Mapping-Class groups, 3-Manifolds, Cortona, Italy, May 24, 2007.
122. The characteristic polynomials of (multi)arrangements, CIMPA summer school ALS & S 2007, Arrangements and Local Systems, Istanbul, Turkey, June 15, 2007.
123. The characteristic quasi-polynomial of integral arrangements and root systems, CIMPA summer school ALS & S 2007, Arrangements and Local Systems, Istanbul, Turkey, June 15, 2007.
124. Periodicity of integral arrangements modulo positive integers, Several Aspects of Hyperplane Arrangements, Kobe, Japan, Feb. 4, 2008.
125. On the free multiarrangements, Several Aspects of Hyperplane Arrangements, 1037TH American Mathematical Society Meeting, special session on Arrangements and Related Topics, Louisiana State University, Baton Rouge, LA, USA, Mar. 28, 2008
126. On the free multiarrangements, Millican Lecture, Colloquium, University of North Texas, May 2, 2008
127. Totally free arrangements of hyperplanes, Conference in Honour of Peter Orlik, Fields Institute, Toronto, Canada, Aug. 19, 2008

128. Periodicity of hyperplane arrangements with integral coefficients modulo positive integers, Finite Groups, vertex operator algebras and combinatorics, RIMS, Kyoto University, Jan. 6, 2009
129. Mathematics related to hyperplane arrangements, Geometry of singularities and related topics, Tokyo University of Science, Mar. 13, 2010
130. Mathematics related to hyperplane arrangements, special one-hour lecture (by a 2010 Algebra Prize recipient) at MSJ Annual Meeting, Keio University, Yokohama, March 26, 2010
131. Algebra and geometry of hyperplane arrangements, colloquium, Hokkaido University, May 21, 2010
132. Combinatorial and algebro-geometric properties of free arrangements, an invited one-hour talk, Workshop on "Algebra and Geometry of Configuration Spaces and related structures" June 21 - 25, 2010, Centro di ricerca matematica Ennio De Giorgi, Pisa, Italy, June 22, 2010
133. The Shi arrangements and the Bernoulli numbers, an invited talk at the Special Session on "The Algebraic Geometry and Topology of Hyperplane Arrangements" at an AMS Sectional Meeting, April 9-10, 2011, College of the Holy Cross, Worcester, MA, USA, April 9, 2011
134. Simple bases for the logarithmic derivation modules of the generalized Shi arrangements, an invited talk at "Topics in the Theory of Weyl Groups and Root Systems (Sekiguchi 60)," September 20-22, 2011, University of Tokyo, September 20, 2011