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# Curriculum Vitae


Name: Hideyasu SHIMADZU

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Nationality: Japan

Sex: Male

## Academic qualifications

MSc (Data science/Statistics), Keio University, Japan, 2004.

PhD (Data science/Statistics), Keio University, Japan, 2008.

## Professional appointments

*Research Fellow*, School of Biology, University of St Andrews, UK (from July 2012).
Centre for Biological Diversity, Scottish Oceans Institute.

*Statistician/Mathematical modeller*, Australian Government Geoscience Australia, Australia.
Environmental Geoscience Division, Coastal, Marine and Climate Change Group (October 2011 – December 2011);
Petroleum and Marine Division, Marine and Coastal Environment Group (April 2008 – September 2011).

*Research Assistant*, Keio University, Japan (April 2004 – March 2008).
The 21st Century Centre of Excellence (COE) Programme "Integrative Mathematical Sciences".

### Adjunct positions

Adjunct Lecturer, Jiyu Gakuen College, Japan (April 2012 – March 2013; April 2004 – March 2009).

Visiting Research Fellow (April 2013 – March 2014), Visiting Research Associate (April 2012 – March 2013), Department of Mathematics, Keio Univeristy, Japan.

Visiting Scientist, Commonwealth Scientific and Industrial Research Organisation (CSIRO) Mathematics, Informatics and Statistics, Australia (September 2008 – December 2011).

Honorary Fellow, Tasmanian Aquaculture and Fisheries Institute, University of Tasmania, Australia (July 2008 – June 2011).

Visiting Research Scholar, CSIRO Mathematical and Information Sciences, Australia (for six weeks in October – November 2007).

**Other invited departmental visits etc including:**
Central Queensland University, School of Health and Human Services (Australia); Civil Engineering and Eco-Technology Consultants (Japan); CSIRO (Australia); Hitotsubashi University, Graduate School of International Corporate Strategy (Japan); The Institute of Statistical Mathematics (Japan); University of Yamanashi, Department of Health Sciences (Japan); The University of the West Indies, Department of Life Sciences (Trinidad and Tobago); Victoria University of Wellington, School of Mathematics, Statistics and Operations Research (New Zealand).

## Honours / distinctions

Annual General Meeting Award *Influence: Team*, Geoscience Australia (2010).

Poster Award, Statistical Modelling and Inference Conference (2010).

Young Researcher Award, the 7th Japanese Swimming Science Society Meeting (2003).

Best Presentation Award, the 2003 Japanese Joint Statistical Meeting (2003).

## Professional membership / activities

Member of the Biometrics Society of Japan; International Biometric Society; Japan Statistical Society.

Fellow of the Royal Statistical Society.

Reviewer for journals: *Acta Oecologica*; *Ecology Letters*; *Global Ecology and Biogeography*; *Journal of Environmental Informatics*; *Methods in Ecology and Evolution*; *SpringerPlus*.

Reviewer for conferences: International Congress on Environmental Modelling and Software (2010); International Congress on Modelling and Simulation (2013).

## Research and professional specialities

*Data science*: Data analysis; Data modelling (statistical/mathematical modelling); Species distribution modelling; Marine ecology, Biodiversity.

## Research experience

Analysis and modelling of data observed in various fields of science, with particular focuses these days on the area of ecology and biodiversity studies.

A range of statistical consulting experience in scientific and industrial research; examples include disciplines of biology, ecology, education, genetics, genomics and school health.

**University of St Andrews**

I have been working on analysis and modelling of ecological data to delineate how species vary over the spatio-temporal scale, responding to the environment factors in different ways. This also needs to take into account for the uncertainty associated with the data. I am currently investigating the temporal change of biodiversity including seasonal variations in ecological communities, to understand key roles in the maintenance of biodiversity.

**Geoscience Australia**

I was involved as a Statistician/Mathematical modeller in the Commonwealth Environment Research Facilities (CERF) Marine Biodiversity Hub project that analysed patterns of Australia's marine biodiversity for the effective marine resource management. My research contributions include: (1) Effects of sampling process in marine surveys (eg sub-sampling) and (2) Use of spatially misaligned data, for estimating biodiversity.

**Keio University**

I was involved in several research projects for building models from data observed, especially according to time. The modelling techniques used were not limited to statistical models but also ordinary differential equations as well as stochastic processes. The collaborators I worked with are across the fields of science: biology, ecology, health science, social science and sport engineering, for example. My collaborative work, for example, cover:

- Neuronal membrane potential activation (point process, differential equation models);
- Swimming race (differential equation models, stochastic process);
- Bird count series (non parametric time series decomposition);
- Time use survey (mixture models);
- Human basal metabolism (non linear models).

# Educational experience (academic year)

## Teaching

Jiyu Gakuen College, Japan (Adjunct lecturer)

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|---|---|---|---|
| *General Seminar* | Research projects for graduation thesis | 3, 4 yr undergrad | (2012, 2007 – 2008, 2005) |
| *Data Science I* | Data analysis using R | 1 yr undergrad | (2007 – 2008) |
| *Data Science II* | Data analysis using R | 2 – 4 yr undergrad | (2008) |
| *Statistics* | Data analysis using R | 2 yr undergrad | (2004 – 2007) |
| *Art of Mathematics* | Calculus, Linear Algebra | 1 yr undergrad | (2004 – 2006) |

Graduation thesis *supervision* and/or examiner: *1*(2005); 4(2007); *2*(2008); *6*(2012); 2(2013); 1(2014).

## Teaching assistant / tutor

Keio University, Department of Mathematics, Japan

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|---|---|---|---|---|
| *Mathematics A1* | Calculus | 1 yr undergrad | Spring | (2004 – 2007) |
| *Mathematics B1* | Linear Algebra | 1 yr undergrad | Spring | (2004 – 2007) |
| *Mathematics A2* | Calculus | 1 yr undergrad | Autumn | (2004 – 2007) |
| *Mathematics B2* | Linear Algebra | 1 yr undergrad | Autumn | (2004 – 2007) |
| *Statistical Science and Its Exercise* | Data analysis using S-PLUS/R | 3 yr undergrad | Spring | (2003 – 2007) |
| *Data Analysis and Its Exercise* | Data analysis using S-PLUS | 3 yr undergrad | Autumn | (2003 – 2007) |

# Publications

1. Yasuo Uchida, Hideyasu Shimadzu and Taka-aki Sekimoto (2003) The relationship between the avifauna and environmental changes at Jiyu-Gakuen in Tokyo: a statistical analysis of the bird-census data for 35 years. *Strix* **21**: 53–70.

2. Hideyasu Shimadzu and Ritei Shibata (2005) Analysis of bird count series by local regression to explore environmental changes. *Journal of the Japan Statistical Society* **J 34**(2): 187–207.
3. Hideyasu Shimadzu, Ritei Shibata and Yuji Ohgi (2008) Modelling swimmers' speeds over the course of a race. *Journal of Biomechanics* **41**(3): 549–555. doi: 10.1016/j.jbiomech.2007.10.007
4. Tatsuhiko Anzai, Hideyasu Shimadzu and Toshiki Endo (2008) Modelling duration of necessary and non-necessary activities in daily life: fitting mixture models to Japanese time use survey data. *Proceedings of the 23rd International Workshop on Statistical Modelling* (Ed. P. Eilers), Utrecht, the Netherlands, 93–98.
5. Scott D. Foster, Hideyasu Shimadzu and Ross Darnell (2012) Uncertainty in spatially predicted covariates: is it ignorable? *Journal of the Royal Statistical Society, Series C (Applied Statistics)* **61**(4): 637–652. doi: 10.1111/j.1467-9876.2011.01030.x
6. Hideyasu Shimadzu, Maria Dornelas, Peter A. Henderson and Anne E. Magurran (2013) Diversity is maintained by seasonal variation in species abundance. *BMC Biology* **11**: 98. doi: 10.1186/1741-7007-11-98
7. Al J. Reeve, Alfredo F. Ojanguren, Amy E. Deacon, Hideyasu Shimadzu, Indar W. Ramnarine and Anne E. Magurran (2014) Interplay of temperature and light influences wild guppy (*Poecilia reticulata*) daily reproductive activity. *Biological Journal of the Linnean Society* **111**: 511–520. doi: 10.1111/bij.12217
8. Machiko Yano, Hideyasu Shimadzu and Toshiki Endo (2014) Modelling temperature effects on milk production: a study on Holstein cows at a Japanese farm. *SpringerPlus* **3**: 129. doi: 10.1186/2193-1801-3-129
9. Maria Dornelas, Nicholas J. Gotelli, Brian McGill, Hideyasu Shimadzu, Faye Moyes, Caya Sievers and Anne E. Magurran (2014) Assemblage time series reveal biodiversity change but not systematic loss. *Science* **344**(6181): 296–299. doi: 10.1126/science.1248484
10. Hideyasu Shimadzu and Ross Darnell (2015) Attenuation of species abundance distributions by sampling. *Royal Society Open Science* **2**: 140219. doi: 10.1098/rsos.140219
11. Isabel Marques da Silva, Nick Hill, Hideyasu Shimadzu, Amadeu M. V. M. Soares and Maria Dornelas (2015) Spillover effects of a community-managed marine reserve. *PLoS ONE* **10**(4): e0111774. doi: 10.1371/journal.pone.0111774
12. Hideyasu Shimadzu, Maria Dornelas and Anne E. Magurran (2015) Measuring temporal turnover in ecological communities. *Methods in Ecology and Evolution*. doi: 10.1111/2041-210X.12438

## Conference papers

1. DandD Instance (2003). The 2003 Japanese Joint Statistical Meeting, Meijo University, Nagoya, Japan.
2. Swimming race data analysis through DandD (2003) (with Y. Ohgi*). Co-speaker at the 2003 Japanese Joint Statistical Meeting, Meijo University, Nagoya, Japan.
3. Analysis of bird count series by local regression to explore environmental changes (2003) (with R. Shibata). The 2003 Japanese Joint Statistical Meeting, Meijo University, Nagoya, Japan.
4. Aptitude of swimmers for race (2003) (with Y. Ohgi). The 7th Japanese Swimming Science Society Meeting, Keio University, Tsuruoka, Japan.

5. Smoothness properties of local polynomial regression and its application to financial time series analysis (2004) (with R. Shibata). Invited speaker at the 4th International Conference on Financial Engineering and Statistical Finance, Hitotsubashi University, Tokyo, Japan.
6. Selection of smoothing parameter by local mean squared error (2004) (with R. Shibata). The 2004 Japanese Joint Statistical Meeting, Fuji University, Hanamaki, Japan.
7. Race data analysis of the 2004 Japan Swimming Championships (2005). Poster talk at the Keio University 21st Century COE Programme Annual Meeting, Keio University, Yokohama, Japan.
8. A model of swimming velocity changes; race data analysis of the 2004 Japan Swimming Champinonships (2005) (with R. Shibata and Y. Ohgi). The 2005 Japanese Joint Statistical Meeting, Hiroshima Prince Hotel, Hiroshima, Japan.
9. Validity of a swimming velocity model constructed from swimming race data analysis (2005) (with R. Shibata and Y. Ohgi). The 2005 Japanese Society of Sciences in Swimming and Water Exercise Meeting, University of Tokyo, Tokyo, Japan.
10. Modelling earthworm's neuron membrane potential (2006). Poster talk at the Keio University 21st Century COE Programme Annual Meeting, Keio University, Yokohama, Japan.
11. Data modelling of neuron membrane potential (2006) (with R. Shibata, T. Shimoi and K. Oka). Invited speaker at the Cherry Bud Workshop 2006 *Building Models from Data*, Keio University, Yokohama, Japan.
12. An integrated model for neural action potential (2006) (with R. Shibata, T. Shimoi and K. Oka). The 2006 Japanese Joint Statistical Meeting, Tohoku University, Sendai, Japan.
13. Modelling swimmers' speeds over the course of a race (2007) (with R. Shibata and Y. Ohgi). Invited speaker at Cherry Bud Workshop 2007 *Interaction through Data*, Keio University, Yokohama, Japan.
14. A data driven model of neural action potentials (2007). Poster talk at the Keio University 21st Century COE Programme Annual Meeting, Keio University, Yokohama, Japan.
15. A three stage model for neural action potentials (2007) (with R. Shibata). The 2007 Japanese Joint Statistical Meeting, Kobe University, Kobe, Japan.
16. Membrane potential modelling led by an *in vivo* measurement of a single neuron (2008). Poster talk at the Keio University 21st Century COE Programme Annual Meeting, Keio University, Yokohama, Japan.
17. Discovery of a structural model for neuronal activation (2008) (with R. Shibata, T. Shimoi and K. Oka). Invited speaker at Cherry Bud Workshop 2008 *Discovery through Data Science*, Keio University, Yokohama, Japan.
18. A structural model for neuronal activation (2008) (with R. Shibata, T. Shimoi and K. Oka). The 19th Biennial Australian Statistical Conference 2008, Sofitel Melbourne, Melbourne, Australia.
19. Modelling duration of necessary and non-necessary activities in daily life: fitting mixture models to Japanese time use survey data (2008) (with T. Anzai* and T. Endo). Co-speaker at the 23rd International Workshop on Statistical Modelling, Utrecht University, Utrecht, the Netherlands.
20. Development of switching state models for bird count series (2008) (with H. Takahashi* and T. Endo). Co-speaker at the XXIVth International Biometric Conference, University College Dublin, Dublin, Ireland.
21. Challenges of multi-survey data analysis; an exploratory approach (2008) (with R. Darnell). Workshop on Spatial and Statistical Modelling, Geoscience Australia, Canberra, Australia.

22. Investigating the issues of sampling in marine surveys (2009) (with R. Darnell). Invited speaker at Australia – Japan Workshop on Data Science, Keio University, Yokohama, Japan.
23. Modelling species abundances in the Australian ocean (2009) (with R. Darnell). The 2009 Japanese Joint Statistical Meeting, Doshisha University, Kyoto, Japan.
24. Some issues in modelling biodiversity using spatially modelled covariates (2009) (with S. D. Foster). Poster talk at the International Biometric Society Australasian Region Conference, Suncourt Hotel and Conference Centre, Taupo, New Zealand.
25. An exploratory analysis of the effects of sampling in marine surveys for biodiversity estimation (2009) (with R. Darnell). The International Biometric Society Australasian Region Conference, Suncourt Hotel and Conference Centre, Taupo, New Zealand.
26. Some issues in modelling biodiversity using spatially modelled covariates (2010) (with S. D. Foster*). Poster talk at Statistical Modelling and Inference Conference to celebrate Murray Aitkin's 70th birthday, Queensland University of Technology, Brisbane, Australia.
27. The effects of sampling in marine surveys on biodiversity estimation (2010) (with R. Darnell). Poster talk at GEOHAB 2010 (Marine Geological and Biological Habitat Mapping), Wellington Town Hall, Wellington, New Zealand.
28. Some issues in predicting biodiversity using spatially modelled covariates (2010) (with S. D. Foster and R. Darnell). GEOHAB 2010, Wellington Town Hall, Wellington, New Zealand.
29. Environmental – biological covariance in the softs sediments surrounding Lord Howe Island (2010) (with M. McArthur* and B. Brooke). Co-speaker at GEOHAB 2010, Wellington Town Hall, Wellington, New Zealand.
30. Uncertainty in marine survey data (2010) (with R. Darnell and S. D. Foster). Invited speaker at the workshop on Predicting Species Distributions and Communities in the Marine Realm, National Institute of Water & Atmospheric Research, Wellington, New Zealand.
31. Statistically relating marine biodiversity to physical variables: coping with error in covariates (2010) (with S. D. Foster* and R. Darnell). Co-speaker at the 47th Australian Marine Sciences Association Conference, The University of Wollongong, Wollongong, Australia.
32. Environmental – biological covariance in the softs sediments surrounding Lord Howe Island (2010) (with M. McArthur*, T. Anderson, Z. Huang, B. Brooke and S. Nichol). Co-speaker at the 47th Australian Marine Sciences Association Conference, The University of Wollongong, Wollongong, Australia.
33. The data-reality gap: an attempt to understand marine biodiversity through survey data (2010) (with S. D. Foster and R. Darnell). Invited speaker at the 2010 Japanese Joint Statistical Meeting, Waseda University, Tokyo, Japan.
34. Reconciling marine survey data for more productive modelling (2010) (with R. Darnell). Invited speaker at the workshop on Ecological and Environmental Data Analysis, Keio University, Yokohama, Japan.
35. Modelling marine biodiversity with error in covariates (2010) (with S. D. Foster and R. Darnell). The XXVth International Biometric Conference, The Federal University of Santa Catarina, Florianópolis, Brazil.
36. What are the effects of sub-sampling in marine surveys for biodiversity estimation? (2011) (with R. Darnell*). Poster talk at the 48th Australian Marine Sciences Association Conference, Esplanade Hotel, Fremantle, Australia.

37. How much does sub-sampling influence biodiversity estimation? (2011) (with R. Darnell). The 48th Australian Marine Sciences Association Conference, Esplanade Hotel, Fremantle, Australia.
38. Modelling biodiversity accounting for sampling effects in marine surveys (2011) (with S. D. Foster and R. Darnell). The 2011 Japanese Joint Statistical Meeting, Kyushu University, Fukuoka, Japan.
39. Quantifying the effect of sampling for biodiversity modelling (2011) (with S. D. Foster and R. Darnell). The International Biometric Society Australasian Region Conference, Sebel Harbourside Hotel, Kiama, Australia.
40. Reconciling the data-reality gap: modelling marine biodiversity from survey data (2011) (with S. D. Foster and R. Darnell). Invited speaker at the workshop on Animal Data Analysis, The Institute of Statistical Mathematics, Tokyo, Japan.
41. Species abundance distributions and random partitions of number (2012) (with M. Sibuya*). Co-speaker at the XXVIth International Biometric Conference, Kobe International Conference Center, Kobe, Japan.
42. Accounting for sampling effects in biodiversity modelling (2012) (with S. D. Foster and R. Darnell). The XXVIth International Biometric Conference, Kobe International Conference Center, Kobe, Japan.
43. Species community modelling for understanding biodiversity (2012). The 2012 Japanese Joint Statistical Meeting, Hokkaido University, Hokkaido, Japan.
44. Modelling the effect of individual difference and weather conditions on milk yield and its composition (2012) (with M. Yano* and T. Endo). Co-speaker at the 74th Symposium of Society for Science on Form, Tokyo University of Agriculture and Technology, Tokyo, Japan.
45. Investigating the relationship of flooding risk and groundwater level: a case study on the Sabi river in Nasu-shiobara city, Japan (2012) (with M. Sakai*, T. Takayama and T. Endo). Co-speaker at the 2012 Applied Mathematics Meeting, Ryukoku University, Shiga, Japan.
46. Species interactions as a multivariate feedback system (2013) (with M. Dornelas, P. A. Henderson and A. E. Magurran). The 4th Channel Network Conference, University of St Andrews, St Andrews, UK.
47. Effects of seasonal variation in abundance on species coexistence (2013) (with M. Dornelas*, P. A. Henderson and A. E. Magurran). Co-speaker at the 11th INTECOL Congress, ExCel, London, UK.
48. Investigating species interactions by modelling multivariate time series data (2013) (with M. Dornelas, P. A. Henderson and A. E. Magurran). Royal Statistical Society 2013 International Conference, University of Northumbria, Newcastle, UK.
49. Modelling biodiversity at the community level (2013). The 2013 Japanese Joint Statistical Meeting, Osaka University, Osaka, Japan.
50. Investigating species interactions in a fish community (2014) (with M. Dornelas, P. A. Henderson and A. E. Magurran). Invited speaker at the ISM Symposium on Environmental Statistics 2014, The Institute of Statistical Mathematics, Tokyo, Japan.
51. On turnover measures of species communities (2014) (with M. Dornelas and A. E. Magurran). The International Statistical Ecology Conference 2014, Montpellier SupAgro, Montpellier, France.
52. Modelling species abundance accounting for sampling mechanisms (2014) (with S. D. Foster and R. Darnell). Invited speaker at the XXVIIth International Biometric Conference, Palazzo dei Congressi, Florence, Italy.
53. Investigating the temporal change of species community (2014). The 2014 Japanese Joint Statistical Meeting, University of Tokyo, Tokyo, Japan.

## Technical reports

1. Yukiyo Kira, Hideyasu Shimadzu and Motoi Yamagata (2002) The records of bird census at Jiyu-Gakuen. *Jiyu Gakuen Annual Report* **6**: 161–180. (In Japanese)
2. Brendan Brooke, Tara Anderson, Neville Barrett, Chris Battershill, Jeff Dunn, Peter Harris, Andrew Heyward, Nicole Hill, Zhi Huang, Gordon Keith, Rudy Kloser, Vanessa Lucieer, Matt McArthur, Scott Nichol, Rick Porter-Smith, Anna Potter, Linda Radke, Hideyasu Shimadzu and Justy Siwabessy (2011) Surrogates Program. *Marine Biodiversity Hub, Commonwealth Environment Research Facilities, Final report 2007-2010* (Ed. N. Bax), Report to Department of Sustainability, Environment, Water, Population and Communities. Canberra, Australia. (`http://www.nerpmarine.edu.au/`)
3. Roland Pitcher, Neville Barrett, Julian Caley, Ross Darnell, Piers Dunstan, Graham Edgar, Nick Ellis, Scott Foster, Nicole Hill, Emma Lawrence, Rebecca Leaper, Camille Mellin, Hideyasu Shimadzu, Russell Thomson and William Venables (2011) Prediction Program. *Marine Biodiversity Hub, Commonwealth Environment Research Facilities, Final report 2007-2010* (Ed. N. Bax), Report to Department of Sustainability, Environment, Water, Population and Communities. Canberra, Australia. (`http://www.nerpmarine.edu.au/`)
4. Hideyasu Shimadzu (2015) Assemblage time series reveal biodiversity change but not systematic loss. *Japanese Scientists in Science 2014*, 2015 Issue: 35.