

CURRICULUM VITAE

PART 1

1a. Personal details				
Full name	<i>Title</i>	<i>First name</i>	<i>Second name(s)</i>	<i>Family name</i>
	Dr	Alexander	Mark	Woodward
Date of birth (YYYY/MM/DD)	1982/03/31			
Present position	Unit Leader, Connectome Analysis Unit (CAU)			
Organisation/Employer	RIKEN			
Contact address	Connectome Analysis Unit, RIKEN Center for Brain Science			
	2-1 Hirosawa, Wako, Saitama			
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1a. Career aspirations and expertise

To combine neuroscience, artificial intelligence, artificial life and computer vision in order to take leadership in advancing our understanding of the brain, cure its diseases, create new brain models, and at the same time to create new and intelligent algorithms that can be applied to solving important research, industry and societal problems.

My expertise is in 3D brain atlasing, connectomics, computer vision, A.I. using deep learning, dynamical systems, artificial life simulation, spiking and mean field neural network simulation, reservoir computing, general purpose computing on graphics cards (GPGPU), HPC data processing, database development, computational stereo-vision, 3D human face reconstruction and expression modeling.

1b. Academic qualifications

2009: PhD Computer Science, University of Auckland, New Zealand

2005: Master's Computer Science, University of Auckland, New Zealand

2004: Bachelor of Technology, Information Technology, University of Auckland, New Zealand

1c. Professional positions held

2019-: Unit leader, Connectome Analysis Unit, RIKEN Center for Brain Science, Japan

2018-2019: Research scientist, Neuroinformatics Unit, RIKEN Center for Brain Science, Japan

2015-2018: Research scientist, Neuroinformatics Japan Center, RIKEN Brain Science Institute, Japan

2010-2014: Post-doctoral research fellow, University of Tokyo, Japan

2010: Tutor for COMPSCI 210: Computer Systems, University of Auckland, New Zealand

2009-2010: Research programmer, ControlVision Ltd, New Zealand

2009: Contract researcher: setting up 3D vision system in laboratory, University of Auckland, New Zealand

2006: Tutor for COMPSCI 773: Robotics and Real-time Control, University of Auckland, New Zealand

2005-2006: Programmer for UFO: Foot Orthotics Project, EFI, New Zealand

2004: Marker for computer science papers COMPSCI 210, 335, 372, University of Auckland, New Zealand

1d. Professional distinctions and memberships

Research Grants / Funding

2018-2021: University of Auckland Strategic Research Initiative Fund (SRIF). External partner. Bringing New Zealand into the Future of Artificial Vision: A multi-disciplinary e-hub for the Advancement of Computer Vision Systems and Solutions.

2016-2018: Catalyst Fund NZ. Principal investigator. Development of an automatic framework for integrating heterogeneous big data: a critical step for better understanding human and nature dynamic functions.

2010-2012: Grant-in-aid as part of JSPS Post-doctoral Award

Keynote presentations

2018: IVCNZ 2018, Auckland, New Zealand

Scholarship and Fellowships

2010-2012: Japan Society for the Promotion of Science (JSPS) Post-doctoral Research Fellow Award

2005-2009: Top Achiever Doctoral Scholarship, Tertiary Education Commission, New Zealand

2006: Computer Science Graduate Student Travel (CSGST) Award, University of Auckland, New Zealand

2004: Faculty of Science Summer Scholarship, University of Auckland, New Zealand

2004: Faculty of Science Study Award, University of Auckland, New Zealand

Prizes

2003: Senior Prize in Computer Science, University of Auckland, New Zealand

Program committee

2017: The 14th European Conference on Artificial Life (ECAL 2017)

2016: The 15th International Conference on the Synthesis and Simulation of Living Systems (ALIFE XV)

Reviewer

2018: International Conference on Advanced Video and Signal-based Surveillance (AVSS)

2015: Electronic Letters on Computer Vision and Image Analysis (ELCVIA)

2012: International Conference on Pattern Recognition (ICPR)

2011: Image and Vision Computing New Zealand (IVCNZ)

2006: Image and Vision Computing New Zealand (IVCNZ)

Hackathon participation

2018: J-Node Hackathon. Shonan village, Shonan, Japan. September 21-23

2017: Brainhack Global 2017 Japan. RIKEN, Wako-shi, Saitama, Japan. March 2-4

2016: J-Node and NIDM Joint Hackathon. Shonan village, Shonan, Japan. July 23-25

2016: J-Node Hackathon. Inter-University Seminar House, Hachioji, Japan. April 9-11

2015: Brain atlas Ideathon/Hackathon. RIKEN, Wako-shi, Saitama, Japan. September 5-7

PART 2

2. Research publications and dissemination

- **Woodward**, T. Hashikawa, M. Maeda, T. Kaneko, K. Hikishima, A. Iriki, H. Okano, Y. Yamaguchi. (2018): The Brain/MINDS 3D digital marmoset brain atlas. *Scientific Data*, 5.
- **Woodward**, Y. H. Chan, R. Gong, M. Nguyen, T. Gee, P. Delmas, G. Gimel'farb, J. M. Flores (2017). A low cost framework for real-time marker based 3-D human expression modeling. *Journal of Applied Research and Technology (JART)*
- **Woodward**, T. Froese, T. Ikegami (2015). Neural coordination can be enhanced by occasional interruption of normal firing patterns: A self-optimizing spiking neural network model. *Neural Networks* 62(C), pp. 39-46.
- T. Froese, **A. Woodward**, T. Ikegami (2014). Are altered states of consciousness detrimental, neutral or helpful for the origins of symbolic cognition? A response to Hodgson and Lewis-Williams. *Adaptive Behavior*, 22(1), pp. 89-95.
- T. Froese, **A. Woodward**, T. Ikegami (2014). People in the Paleolithic could access the whole spectrum of consciousness: Response to Helvenston. *Adaptive Behavior* 22, pp. 282-285.
- T. Froese, **A. Woodward**, T. Ikegami (2013). Turing instabilities in biology, culture, and consciousness? On the enactive origins of symbolic material culture. *Adaptive Behavior*, 21(3), pp. 199-214
- **Woodward**, P. Delmas, Y. H. Chan, A. G. Strozzi, G. Gimel'farb, J. M. Flores. (2012). An interactive 3D video system for human facial reconstruction and expression modeling. *Journal of Visual Communication and Image Representation* 23(7), pp. 1113-1127.
- Duwig, P. Delmas, K. Müller, B. Prado, H. Morin, K. Ren, **A. Woodward** (2008). Quantifying fluorescent tracer distribution in Allophanic soils to image solute transport. *European Journal of Soil Science*, 59(1): 94-102.

Book chapters

- Gastelum, P. Delmas, J. Marquez, **A. Woodward**, J. James, J., M. Lievin, and G. Gimel'farb. (2009). 3D Lip Shape SPH Based Evolution Using Prior 2D Dynamic Lip Features Extraction and Static 3D Lip Measurements in Visual Speech Recognition: Lip Segmentation and Mapping, chapter 7, pages 213-238. IGI Global, ISBN: 978- 1-60566-186-5.

Conference papers and abstracts (as noted)

2018

- Watakabe, J. Wang, M. Takaji, H. Mizukami, **A. Woodward**, H. Skibbe, K. Nakae, Y. Yamaguchi, S. Ishii, T. Yamamori. Prefrontal projection mapping of the common marmoset. SFN 2018. (Abstract.)
- H. Tsukada, H. Hamada, C.E. Gutierrez, K. Nakae, H. Skibbe, S. Ishii, **A. Woodward**, J. Hata, H. Okano, and K. Doya. Analysis of Structure-Function Relationship using a Whole-Brain Model based on the Common Marmoset MRI Data. JNNS 2018. (Abstract.)
- **A. Woodward**, R. Gong, C.E. Gutierrez, H. Abe, N. Ichinohe, K. Doya, Y. Yamaguchi (2018) An automated computational algorithm for injection site segmentation and reconstruction in the Nanozoomer data analysis pipeline. Neuroinformatics 2018. (Abstract.)

2017

- **Woodward**, C. E. Gutierrez, H. Tsukada, H. Abe, N. Ichinohe, K. Doya, Y. Yamaguchi. A Connectomics Pipeline for Tracer Injection Studies of the Marmoset Monkey Brain. Neuroinformatics 2017. (Abstract.)
- **A. Woodward**, R. Gong, Y. Yamaguchi. Marmoset Brain Atlas Applied to dMRI Based Connectomics. AINI 2017. (Abstract.)
- Columnar and diffuse connectivity of the marmoset PFC neurons. A. Watakabe, J. Wang, M. Takaji, H. Mizukami, **A. Woodward**, T. Kawase, H. Skibbe, K. Nakae, Y. Yamaguchi, S. Ishii, T. Yamamori. SfN 2017. (Abstract.)

2016

- **Woodward**, Y. Yamaguchi. Brain Image Registration Techniques for Connectomics Analysis. NBNI 2016, Hong Kong. (Abstract.)
- Watakabe, J. Wang, M. Takaji, H. Mizukami, **A. Woodward**, T. Kawase, H. Skibbe, Y. Yamaguchi, S. Ishii, T. Yamamori. Mapping connectivity of marmoset prefrontal cortex by serial two-photon tomography Neuroscience 2016 (SfN), San Diego, U.S.A. (Abstract.)
- **Woodward**, M. Maeda, T. Takeuchi, H. Oka, Y. Morii, Y. Okumura, T. Hashikawa and Y. Yamaguchi. High-resolution Brain Image Registration on a Distributed Computing System in the Brain/MINDS Project" Neuroinformatics 2016, Reading, United Kingdom. (Abstract.)

2015

- Y. Yamaguchi, Y. Okumura, Y. Isono, S. Suenaga, I. Ishii, A. Honda, T. Kannon, H. Oka, **A. Woodward**, Y. Morii, M. Maeda, T. Hashikawa and S. Usui. Integrative development of multidisciplinary neuroinformatics platforms in Japan Node. Neuroinformatics 2015, Cairns, Australia, 20 Aug - 22 Aug, 2015. (Abstract.)
- Y. Morii, Y. Okumura, M. Maeda, **A. Woodward**, M. Morita, H. Yokota and Y. Yamaguchi. Neuroinformatics Platform for Data Sharing and Global Collaboration in the Brain/MINDS Project. Neuroinformatics 2015, Cairns, Australia, 20 Aug - 22 Aug, 2015. (Abstract.)

2013

- M. Oka, T. Ikegami, **A. Woodward**, Y. Zhu, K. Kato. Cooperation, Congestion and Chaos in Concurrent Computation, ECAL 2013. (Paper.)
- A. Woodward**, T. Ikegami, M. Oka. Understanding Temporality and Asynchronicity in the Brain. Japanese Society for Artificial Intelligence (JSAI) 2013, June 4-7. (Paper.)

2012

- **Woodward**, T. Ikegami, Y. Ogai. A Self-sustaining Visual Feedback Machine using Chaotic Neural Dynamics. Accepted for Alife 13, U.S.A., 2012. (Abstract).
- **Woodward**, P. Delmas, T. Ikegami. An Optimal Parameter Analysis and GPU Acceleration of the Image Receptive Fields Neural Network Approach. IVCNZ 2012, November 26-28, New Zealand. (Paper.)

2011

- **Woodward**, T. Ikegami, Y. Ogai. Studying Mind Time Structure with a Video Feedback Machine. In Proceedings of Association for the Scientific Study of Consciousness (ASSC), Japan, 2011. (Abstract.)
- M. Nguyen, P. Delmas, G. Gimel'farb, Y.H. Chan, A. G. Strozzi, **A. Woodward**. Online rapid prototyping of 3D objects using GPU-based 3D cloud computing: Application to 3D face modelling. In Proceedings of the 12th IAPR Conference on Machine Vision Applications (MVA 2011), Japan, 2011. (Paper.)
- M. Nguyen, R. S. Yang, **A. Woodward**, P. Delmas, and G. Gimel'farb. Novel Web-based Autostereogram Creation using GPU Stereo Vision. In *Proceedings of Image and Vision Computing New Zealand Conference (IVCNZ)*, New Zealand, 2011. (Paper.)
- **A. Woodward** and P. Delmas. An Integrated Framework for Feature Extraction, Object Recognition and Stereo Vision with GPU support. In *Proceedings of Image and Vision Computing New Zealand Conference (IVCNZ)*, New Zealand, 2011. (Paper.)

- **A. Woodward** and T. Ikegami. A Reservoir Computing approach to Image Classification using Coupled Echo State and Back-Propagation Neural Networks. In *Proceedings of Image and Vision Computing New Zealand Conference (IVCNZ)*, New Zealand, 2011. (Paper.)

2010

- **Woodward**, D. Berry, and J. Dunning. Real-Time Stereo Vision on the VisionServer Framework for Robot Guidance. In *Proceedings of Image and Vision Computing New Zealand Conference (IVCNZ)*, New Zealand, 2010. (Paper.)

2008

- **Woodward**, P. Delmas, and G. Gimel'farb. A 3D Video Scanner for Face Performance Capture. In *Proceedings of Image and Vision Computing New Zealand Conference (IVCNZ)*, pages 195–200, New Zealand, 2008. (Paper.)

2007

- **Woodward**, P. Delmas, G. Gimel'farb, and J. Marquez. Low Cost Virtual Face Performance Capture Using Stereo Web Cameras. In *Proceedings of the Pacific-Rim Symposium on Image and Video Technology Conference (PSIVT)*, pages 763–776, Chile, 2007. (Paper.)

2006

- **Woodward**, D. An, G. Gimel'farb, and P. Delmas. A Comparison of Three 3-D Facial Reconstruction Approaches. In *Proceedings of the IEEE International Conference on Multimedia and Expo (ICME)*, pages 2057–2060, Canada, 2006. (Paper.)
- **Woodward**, D. An, Y. Lin, P. Delmas, G. Gimel'farb, and J. Morris. An Evaluation of Three Popular Computer Vision Approaches for 3-D Face Synthesis. In *Proceedings of Structural, Syntactic, and Statistical Pattern Recognition (SSPR)*, pages 270–278, China, 2006. (Paper.)
- D. An, **A. Woodward**, P. Delmas, G. Gimelfarb, and J. Morris. Comparison of Active Structure Lighting Mono and Stereo Camera Systems: Application to 3D Face Acquisition. In *Proceedings of the Seventh Mexican International Conference on Computer Science (ENC)*, pages 135–141, Mexico, 2006. (Paper.)
- J. Lin, **A. Woodward**, D. An, J. Morris, P. Delmas, G. Gimel'farb. Rectifying Images for Stereo Vision. . In *Proceedings of Image and Vision Computing New Zealand Conference (IVCNZ)*, Auckland, New Zealand, November 27-29, 2006. (Paper.)

2005

- **Woodward**, P. Delmas. Combining Computer Graphics and Image Processing for Low Cost Realistic 3D Face Generation and Animation. In *Proceedings of the International IAPR Conference on Machine Vision Applications*. Tsukuba, Japan, May 16-18, 2005. (Paper.)
- D. An, **A. Woodward**, P. Delmas, and C.-Y. Chen. Comparison of Structured Lighting Techniques with a View for Facial Reconstruction. In *Proceedings of the Image and Vision Computing New Zealand Conference (IVCNZ)*, pages 195–200, New Zealand, 2005. (Paper.)
- **Woodward** and P. Delmas. Synthetic Ground Truth for Comparison of Gradient Field Integration Methods for Human Faces. In *Proceedings of the Image and Vision Computing New Zealand Conference (IVCNZ)*, pages 155–160, New Zealand, 2005. (Paper.)
- **Woodward** and P. Delmas. Computer vision for Low Cost 3-D Golf Ball and Club Tracking. In *Proceedings of the Image and Vision Computing New Zealand Conference (IVCNZ)*, pages 293-298, New Zealand, 2005. (Paper.)

2004

- P. Delmas, **A. Woodward** and P. Leclercq. Can Stereo Matching Algorithms Accurately Render Face Features?. In *Proceedings of the Image and Vision Computing New Zealand Conference (IVCNZ)*, November 21-23 2004, Akaroa, New Zealand. (Paper.)
- P. Leclercq, J. Liu, M. Chan, **A. Woodward**, G. Gimel'farb and P. Delmas. Comparative Study of Stereo Algorithms for 3D Face Reconstruction. In *Proceedings of Advanced Concepts for Intelligent Vision Systems (ACIVS)*, Brussels, Belgium, August 31-September 3, 2004. (Paper.)
- P. Leclercq, J. Liu, **A. Woodward** and P. Delmas. Which Stereo Matching Algorithm for Accurate 3D Face Creation. In *Proceedings of the Tenth International Workshop on Combinatorial Image Analysis (IWCIA)*, December 1-3 2004, Auckland, New Zealand. (Paper.)
- **Woodward** and P. Delmas. Towards a Low Cost Realistic Human Face Modelling and Animation Framework. In *Proceedings of the International Vision Conference in New Zealand (IVCNZ)*, November 21-23 2004, Akaroa, New Zealand. (Paper.)
- **Woodward**, P. Leclercq, G. Gimel'farb and P. Delmas. Generation of an Accurate Facial Ground Truth for Stereo Algorithm Evaluation. In *Proceedings of the International Conference on Computer Vision and Graphics (ICCVG)*, September 22-24, 2004 Warsaw, Poland. (Paper.)