Alexander Robert Pettitt

PhD, MPhys

Curriculum Vitae

PERSONAL DETAILS

Birth	December 19, 1987
Gender	Male (he/him)
Nationality	British
Mobile	(+81) 070 2811 4819
E-Mail	alex@astro1.sci.hokudai.ac.jp
Webpage	https://astro3.sci.hokudai.ac.jp/~alex/

EDUCATION

Ph.D. in Astrophysics 1/10/2010 – 30/9/2014
University of Exeter, U.K.

    Supervisor: Dr Clare Dobbs

    Thesis Title: The Morphology of the Milky Way

Master of Physics, 1st *(honours)* 1/10/2006 – 30/7/2010
Durham University, U.K.

    Master's project supervisor: Dr Vincent Eke

    Specialised in the Lunar atmosphere, cosmology, particle theory and theoretical matter physics.

EMPLOYMENT

Assistant Professor (tenure-track) 18/8/2021 – present

    Member of physics and astronomy faculty at California State University Sacramento.

    Undergraduate physics and astronomy lecturing, conduct own research and engage in public outreach.

Assistant Professor (fixed-term) 1/4/2016 – 6/8/2021

    Appointed in joint post with education and research divisions of Hokkaido University.

    Teach undergraduate physics courses and conduct own research in the field of galactic physics.

Post-Doctoral Researcher 1/9/2014 – 31/3/2016

    Position as a Post-Doctoral Researcher in the field of astrophysics at

    Hokkaido University, Japan, under the employment of Assistant Professor Elizabeth Tasker

    in the field of of galactic structure and interactions.

SKILLS

Programming	FORTRAN, PYTHON, *C*, LaTeX
OS	Windows, Linux, Mac OS X
Refereeing	MNRAS (2016 – present), ApJ (2017 – present), ApSS (2017)
Observing	*Observatoire Haute Provence* (2011), running evening observing sessions for undergraduates at the University of Exeter (2010 – 2013).

Knowledge and extensive experience in using smoothed particle hydrodynamical and N-body simulations, with the application to galactic-scale systems (with the codes GASOLINE, GADGET, PHANTOM, SPHNG, GIZMO). A working knowledge and experience applying the process of radiative transfer to the Galactic interstellar medium and exo-planetary atmospheres. Familiarity with high performance computing facilities (e.g. XSEDE, DiRAC, Sharcnet, SciNet, CFCA-XC30/50) and the use of OPENMP and MPI parallelisation methods. Experience with maintaining and creating websites.

AWARDS AND PROPOSALS

- Awarded 2.86 million yen Early Career Scientist KAKENHI grant (20K14456) from the Japanese Society for the Promotion of Science (2020 – 2023).

- Successful adopted proposals for high performance computing resources for NAOJ/CFCA's XC-30/50 clusters while appointed at Hokkaido University. **Awarded eight distinct allocations** including: 2015($\times$2) 2016, 2017, 2018, 2019, 2020, 2021 as well as **Co-I as supervisor on six successful student applications**.

- Co-I on start-up allocation on NSF's XSEDE high performance computing facility (2021), PI: S. Benincasa, PHY210020.

- Co-I on the SEDIGISM galactic plane survey, an adopted ESO large programme (2014).

- STFC PhD studentship at the University of Exeter, U.K. (2010).

GRADUATE STUDENTS

- Primary supervisor for MSc student Elizabeth Iles on the topic of star formation in simulations of barred-spiral galaxies (2018 – 2020). Continuing as PhD supervisor (2020–present).

- Supervisor for MSc student Tung Do on the topic of galactic stellar feedback in dwarf galaxies (2021 – present).

- Primary supervisor for MSc student Veronica Zhang on the topic of galactic spiral arm generation mechanisms (2018 – 2020).

- Additional partial supervision of other students in the astrophysics group at Hokkaido University (N. Sakre and N. Nguyen). Examiner for PhD vivas of T. Shima (Hokkaido University) and T. Michiyama (Sokendai University) and several MSc students.

TEACHING AND OUTREACH

California State University Sacramento teaching

Lecture course: Mathematical Methods (physics majors) 2021 – present
  Advanced mathematical techniques for physics undergraduates. Including linear algebra, ODEs, Fourier techniques, solutions to PDEs, vector calculus.
Lecture course: Stars and Galaxies Methods (general education) 2021 – present
  Non-calculus astronomy course for beginners. Topics include observing the night sky, history of astronomy, stellar physics, galaxy evolution and basic cosmology.

Hokkaido University teaching

Lecture course: Statistical Mechanics II ($3^{\rm rd}$ year undergraduates) 2019 – 2021
  Teaching students at Hokkaido University intermediate level statistical mechanics. Topics include partition functions, quantum particle distributions, interactions. Includes 90min seminar/tutorial after each lecture.
Lecture course: Fourier Analysis ($2^{\rm nd}$ year undergraduates) 2018 – 2021

Teaching students at Hokkaido University Fourier-like mathematical techniques, including Fourier series/transforms, Laplace transforms, solutions to PDEs. Includes 90min seminar/tutorial after each lecture.

Lecture course: Classical Mechanics II (2ⁿᵈ year undergraduates) 2018 – 2021

Teaching students at Hokkaido University upper level classical mechanics, focussing mainly on analytical mechanics (Lagrangian, Hamiltonian, Hamilon-Jacobi theory, coupled oscillators). Includes 90min seminar/tutorial after each lecture.

Lecture course: Classical Mechanics I (2ⁿᵈ year undergraduates) 2018 – 2021

Teaching students at Hokkaido University classical mechanics, including advanced mathematical approaches to solve equations of motion (pre-analytical mechanics). Includes 90min seminar/tutorial after each lecture.

Lecture course: Physics I (1ˢᵗ year undergraduates) 2017 – 2021

Teaching students at Hokkaido University their foundational physics module, including classical mechanics, waves and optics.

University of Exeter teaching

Laboratory Demonstrator: Astrophysics Labs (2ⁿᵈ year undergraduates) 2010 – 2013

Demonstrated astrophysics labs at the University of Exeter, including daytime *IRAF* reduction sessions, evening observations with university telescope and marking reports.

Outreach and Engagement

Talks for amateur astronomy societies, organising demonstrations for science fairs, demonstrations and lectures at local schools in the U.K. and Japan. Writing blog posts about my work for Oxford University Press and Hokkaido University. Co-hosted a campus radio show on popular science for an undergraduate audience at the University of Exeter (2014). Conducted interactive demonstrations for BBC Sky at Night evenings, and for Big Bang Science Fairs in the U.K. (2011 – 2012). Gave astrophysics talks to prospective undergraduate physics students to introduce them to the astrophysics group at the University of Exeter (2010 – 2012). Represented Hokkaido University at a university recruitment fair in Taipei (2019).

INSTITUTIONAL DUTIES

- Admission committee member for prospective students at Hokkaido University. Duties include screening application documents, conducting interviews and overall applicant evaluation.

- Representing Hokkaido University at career fairs and visiting high school student events (e.g. giving introductory talks). Aid with design of promotional materials, both paper and audio/visual.

- Co-creator/admin of several Hokkaido University webpages: https://www.oia.hokudai.ac.jp/isp/, https://astro3.sci.hokudai.ac.jp/ASTRO-HOMEPAGE.

TALKS

Invited Talks
- *Triggered Star Formation*, Nagoya, July. 2021.
- *FUGIN Science Workshop*, Nagoya, Feb. 2018.
- *COMING Science Workshop*, Tokyo, Nov. 2016.
- Seminar at University of Bristol astrophysics department, 2013.

Contributed Talks and Seminars

Life and Times of the Milky Way (Shanghai), ISM-SSP (Cologne), From Stars to Galaxies (Hokkaido), Annual Meeting of Japanese Astronomical Society, x2 (Hokkaido, Kobe, Tsukuba), ALMA Science Workshop (Osaka), UK National Astronomy Meeting (Manchester). Seminar talks given at SHAO (China), McMaster University, x2 (Canada), CITA (Canada), NAOJ (Tokyo, multiple), IPMU (Tokyo), ELSI (Tokyo), RIKEN (Kobe). Posters presented at IAUXXIX (Honnolulu), Dirac Day (Leicester), IAU 298 (Lijiang), U.K. National

Astronomy Meeting, x2 (Manchester, Llandudno). Attended the program *Dynamical Models for Stars and Gas in Galaxies in the Gaia Era* at KITP (Santa Barbara) and accompanying Gaia-SPRINT.

PUBLICATIONS

The following have been submitted and are in the referee stage:

- Kawana, Y., Saito, T., Okumura, S., Kawabe, R., Espada, D., Iono, D., Kaneko, H., Lee, M, Michiyama, T., Motohara, K., Nakanishi, K., **Pettitt, A. R.**, Randriamanakoto, Z., Ueda, J., Yamashita, T., submitted to *ApJ*.

- Dobbs, C. L., Bending, T., **Pettitt, A. R.**, Bate, M. R., submitted to *MNRAS*.

- Iles, E. J. L., **Pettitt, A. R.**, Okamoto, T., submitted to *MNRAS*.

The following are published, peer reviewed papers:

- Sakre, N., Habe, A., **Pettitt, A. R.**, Okamoto,T., 2021, *PASJ*, 73, S385.

- Urquhart, J. S., Figura, C., Cross, J. R., Wells, M. R. A., T. J. T. Moore, Eden, D. J., Ragan, S. E., **Pettitt, A. R.**, Duarte-Cabral, A., Colombo, D., Schuller, F., et al., 2021, *MNRAS*, 500, 3.

- Schuller, F., Urquhart, J. S., Csengeri, T., Colombo, D., Duarte-Cabral, A., Mattern, M., Ginsburg, A., **Pettitt, A. R.**, Wyrowski, F., Anderson, L., et al., 2021, *MNRAS*, 500, 3.

- Durate-Cabral, A., Colombo, D., Urquhart, J. S., et al., 2021, *MNRAS*, 500, 3.

- Quillen, A. C., **Pettitt, A. R.**, Chakrabarti, S., Zhang, Y., Gagne, J., Minchev, I., 2020, *MNRAS*, 499, 4.

- Benincasa, S. M., Wadsley, J. W., Couchman, H. M. P., **Pettitt, A. R.**, Keller, B. W., Woods, R. M., Grond, J. J., 2020, *MNRAS*, 499, 2.

- **Pettitt, A. R.**, Dobbs, C. L., Baba, J., D. Colombo, A. Duarte-Cabral, F. Egusa, A. Habe, 202, *MNRAS*, 498, 1.

- Hunt, J., Johnston, K. V., **Pettitt, A. R.**, Bovy, J., Cunningham, E. C., Kawata, D., Hogg, D., 2020 *MNRAS*, 497, 1.

- **Pettitt, A. R.**, Ragan, S. E., Smith, M. C., 2020, *MNRAS*, 491, 2.

- Benincasa, S. M., Wadsley, J. W., Couchman, H. M. P., **Pettitt, A. R.**, Tasker, E. J., 2019, *MNRAS*, 486, 4.

- Dobbs, C. L., Rosolowski, E., **Pettitt, A. R.**, Braine, J., Corbelli, E., Sun, J., 2019, *MNRAS*, 485, 4.

- Salak, D., Noma, Y., Sorai, K., Miyamoto, Y., Kuno, N., **Pettitt, A. R.**, Kaneko, H., Tanaka, T., et al., 2019, *PASJ*, psz004.

- Espada, E., Martin, S., Verley, S., **Pettitt, A. R.**, Matshitaka, S., Argudo-Fernandez, M., Randriamanakoto, Z., Hsieh, P., Saito, T., et al., 2018, *ApJ*, 866, 2.

- **Pettitt, A. R.**, Egusa, F., Dobbs, C. L., 2018, Tasker, E. J., Habe, A., Fujimoto, Y., 2018, *MNRAS*, 480, 3556.

- Price, D. J., Wurster, J., Nixon, C., Tricco, T. S., Toupin, S., **Pettitt, A. R.**, Chan, C., et al., 2018, *PASA*, 35, 31.

- Dobbs, C. L., **Pettitt, A. R.**, Corbelli, E., Pringle, J. E., 2018, *MNRAS*, 478, 3793.

- Nguyen, N. K., **Pettitt, A. R.**, Tasker, E. J., Okamoto, T., 2018, *MNRAS*, 475, 27.

- **Pettitt, A. R.**, Wadsley, J. W., 2018, *MNRAS*, 474, 5645.

- **Pettitt, A. R.**, Tasker, E. J., Wadsley, J. W., Keller, B. W., Benincasa, S. M., 2017, *MNRAS*, 468, 4189.

- Schuller, F., et al., 2017, *A&A*, 601, A124.

- Dobbs, C. L., Price, D. J., **Pettitt, A. R.**, Bate, M. R., Tricco, T. S., 2016, *MNRAS*, 461, 4482.

- Few, C. G., Dobbs, C. L., **Pettitt, A. R.** & Konstandin, L., 2016, *MNRAS*, 460, 4382.

- **Pettitt, A. R.**, Tasker, E. J. & Wadsley, J. W., 2016, *MNRAS*, 458, 3990.

- **Pettitt, A. R.**, Dobbs, C. L., Acreman, D. A. & Bate, M. R., 2015, *MNRAS*, 449, 3911.

- Tremblin P., Anderson L. D., Didelon P., Raga A. C., Minier V., Ntormousi E., **Pettitt A.**, Pinto C., Samal M., Schneider N. & Zavagno A., 2014, *A&A*, 568, 4.

- **Pettitt, A. R.**, Dobbs, C. L., Acreman, D. A. & Price, D. J., 2014, *MNRAS*, 444, 919.

- Wilson, P. A., et al., 2014, *MNRAS*, 438, 2395.

Published conference proceedings (first author only):

- **Pettitt, A. R.**, Tasker, E. J. & Wadsley, J. W., 2015, Proceedings of the IAU Symposium No. 315, Honolulu, U.S.A.

- **Pettitt, A. R.**, Dobbs, C. L., Acreman, D. A. & Price, D. J., 2014, Proceedings of the IAU Symposium No. 298, Lijiang, China.