Monday 15 – Tuesday 16 July, 2019

Overview

This free 2-day workshop will provide an introduction to phylogenetic analysis, including practical exercises based on the software *MEGA* and *BEAST 2*. It is primarily aimed at research students and postdoctoral researchers, but other prospective attendees are welcome. Prior knowledge of basic phylogenetics is helpful but not strictly essential.

The workshop will comprise a series of lectures and practical exercises. The first day will cover interpreting phylogenetic trees, molecular data, sequence alignment, evolutionary models, and phylogenetic methods. The second day will provide an introduction to Bayesian phylogenetic analysis and will include models and priors, molecular clocks, and estimating timescales.

Instructors

The workshop will be led by Simon Ho (University of Sydney) and David Duchêne (Australian National University). The instructors will comprise members of the **Molecular Ecology, Evolution, and Phylogenetics Laboratory** at the University of Sydney, including Nate Lo, Cara Van Der Wal, Perry Beasley-Hall, and Kai Tea, with assistance from Sam Traves.

Venue

The workshop will be held in the Abercrombie Building at the University of Sydney. This building is a short walk from Redfern Station and is on the corner of Abercombie St and Codrington St. If you are travelling from outside Sydney, please organise your own accommodation (suggestions are provided below).

Tea, coffee, biscuits, and fruit will be available during the workshop. Please bring a reuseable cup if you have one. Lunch will not be provided, but we offer some recommendations for nearby food outlets below.

Computing

The practical exercises will involve basic analyses of prepared data sets. You will need to bring your own laptop. Please download and install *MEGA* (version 6 or higher), *BEAST* 2 (version 2.4.8 or higher), *Tracer*, and *FigTree* prior to the workshop. Free wifi access will be available.

Registration

The workshop is <u>free</u> to attend, but there will be a limit of 40 participants. To express your interest in attending the workshop, please contact Simon Ho (simon.ho@sydney.edu.au). If we are unable to offer places to everyone, we will give priority to research students.
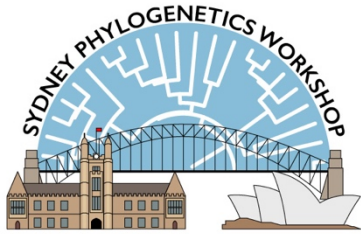
Workshop Programme

Monday 15 July: Introduction to phylogenetic analysis

09.15 – 09.30	Arrival and set-up	
09.30 – 09.40	Welcome	Simon Ho
09.40 – 10.30	Lecture 1.1: Introduction to molecular phylogenetics	Nate Lo
10.30 – 11.00	Practical 1a: Sequence alignment in *MEGA*	Nate Lo
	--- Break ---	
11.15 – 12.00	Lecture 1.2: Evolutionary models	David Duchêne
12.00 – 12.30	Lecture 1.3: Phylogenetic data	Cara Van Der Wal
	--- Lunch break ---	
13.15 – 14.00	Lecture 1.4: Phylogenetic methods	Simon Ho
14.00 – 14.15	Lecture 1.5: Gene trees	Simon Ho
14.15 – 17.00	Practical 1b: Model selection and phylogenetics in *MEGA*	Cara Van Der Wal & Kai Tea

Tuesday 16 July: Bayesian phylogenetics and molecular dating

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09.15 – 09.30	Arrival	
09.30 – 10.30	Lecture 2.1: Bayesian phylogenetic analysis	Simon Ho
10.30 – 11.00	Lecture 2.2: Models and priors	David Duchêne
	--- Break ---	
11.15 – 12.30	Practical 2a: Bayesian analysis using *BEAST*	David Duchêne
	--- Lunch break ---	
13.15 – 13.45	Lecture 2.3: Molecular dating	Simon Ho
13.45 – 14.15	Lecture 2.4: Calibrating the molecular clock	David Duchêne
14.15 – 17.00	Practical 2b: Molecular dating using *BEAST*	Perry Beasley-Hall
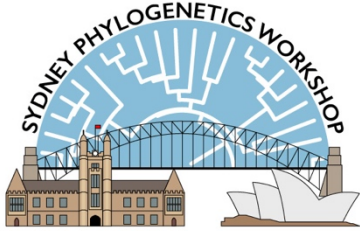
Useful Readings

Reference books

- *An Introduction to Molecular Evolution and Phylogenetics*
  Bromham (2016) Oxford University Press.

- *Molecular Evolution: A Statistical Approach*
  Yang (2014) Oxford University Press.

- *The Phylogenetic Handbook*
  Lemey, Salemi, & Vandamme (2009) Cambridge University Press.

- *Bayesian Phylogenetics: Methods, Algorithms, and Applications*
  Chen, Kuo, & Lewis (2014) Chapman & Hall / CRC.

Molecular phylogenetics and Bayesian inference

- *Molecular phylogenetics: principles and practice*
  Yang & Rannala (2012) *Nat Rev Genet* 13: 303–314.

- *State-of-the-art methodologies dictate new standards for phylogenetic analysis*
  Anisimova et al. (2013) *BMC Evol Biol* 13: 161.

- *Bayesian phylogenetic and phylodynamic data integration using BEAST 1.10*
  Suchard et al. (2018) *Virus Evol* 4: vey016.

Molecular dating

- *A practical guide to molecular dating*
  Sauquet (2013) *C R Palevol*, 12: 355–367.

- *Bayesian molecular clock dating of species divergences in the genomics era*
  dos Reis, Donoghue, & Yang (2016) *Nat Rev Genet* 17: 71–80.

- *Estimating evolutionary timescales using the molecular clock*
  Ho & Duchêne (2014) *Mol Ecol* 23: 5947–5965.

- *Bayesian molecular dating: opening up the black box*
  Bromham et al. (2018) *Biol Rev* 93: 1165–1191.
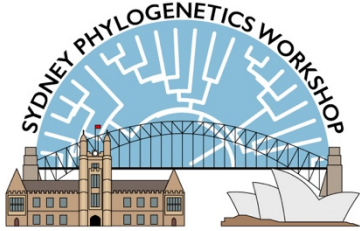
Accommodation

The Sydney Phylogenetics Workshop will be held in the Abercombie Building, University of Sydney. If you are travelling from outside Sydney to attend the workshop, please organise your own accommodation.

The workshop venue is on the corner of Codrington St and Abercrombie St, within short walking distance of Redfern Station. The university has excellent public transport links and is a short bus trip (<30 min) from the City (Sydney, Haymarket, Ultimo, and Pyrmont) or parts of the Inner West (Camperdown, Chippendale, Darlington, Newtown, Glebe, Forest Lodge, Enmore, and Erskineville).

The list below contains a few options for accommodation close to the University of Sydney. All of these have received generally good review scores on Tripadvisor. A range of options can also be found on airbnb (https://www.airbnb.com.au/).

>$200 per night

- Veriu Camperdown (4 stars), 84-86 Parramatta Road, Camperdown NSW 2050
  https://www.veriu.com.au/camperdown/en/

>$150 per night

- Rydges Camperdown (3.5 stars), 9 Missenden Road, Camperdown NSW 2050
  https://www.rydges.com/accommodation/sydney-nsw/camperdown/

- Best Western Haven Glebe (4 stars), 196 Glebe Point Road, Glebe NSW 2037
  https://www.havenhotel.com.au/

- Verona Guest House (4 stars), 224 Glebe Point Road, Glebe NSW 2037
  http://www.veronaglebe.com/

~$150 per night

- Adina Apartment Hotel Sydney Chippendale (4 stars), 74-80 Ivy Street, Darlington NSW 2008
  https://www.adinahotels.com/en/apartments/sydney-chippendale/

- Ryals Hotel (3 stars), 253 Broadway, Glebe, NSW 2037
  http://www.ryalshotels.com.au/broadway-rooms/

<$100 per night

- Alishan International Guest House (3 stars), 100 Glebe Point Rd, Glebe NSW 2037
  https://alishan.com.au/

- Mad Monkey Broadway Backpackers (2 stars), 20 City Rd, Chippendale NSW 2008
  http://www.madmonkeybroadway.com.au/

- VLA Glebe Backpackers (2 stars), 256 Glebe Point Rd, Glebe NSW 2037
  http://www.villagelivingaustralia.com.au/properties/vla-glebe

Camperdown/Darlington Campus map

Workshop

Redfern Station →

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200 / 100 / 50 / 0 Metres

LEGEND

Medical centre	Telephone
Information	Carpark
Post office	Campus Security
Eateries	Motorcycle parking
ATM	
STA bus stop	

For more assistance phone the Visitors Information Centre on 9351 3100

Streets and roads
BROADWAY, CITY ROAD, GLEBE POINT ROAD, DERWENT STREET, ARUNDEL STREET, PARRAMATTA ROAD, ROSS STREET, MISSENDEN ROAD, CLEVELAND STREET, BLACKWATTLE LANE, SHEPHERD STREET, BOUNDARY STREET, CADER ROAD, LANDER STREET, ABERCROMBIE STREET, CODRINGTON STREET, RAGLAN STREET, BUTLIN AVENUE, DARLINGTON ROAD, DARLINGTON LANE, GOLDEN GROVE STREET, MAZE CRESCENT, ENGINEERING WALK, CREEK, BARFF ROAD, EASTERN AVENUE, UNIVERSITY AVENUE, UNIVERSITY PLACE, MANNING ROAD, FISHER ROAD, CITY ROAD GATE, PHYSICS ROAD, SCIENCE ROAD, WILKINSON AXIS, RUSSELL PLACE, GROSE STREET, SHEPHERD STREET, WESTERN AVENUE, WESTERN AVENUE GATE, CARILLON AVENUE, LITTLE QUEEN STREET, KING STREET, CAMPBELL STREET, LONGDOWN STREET, ELIZABETH ST, CROQUET LANE, BLACKBURN CIRCUIT, REGIMENTAL DRIVE, JOHN HOPKINS DRIVE, GROSE FARM LANE, AYLESBURY STREET, KERRIDGE PLACE

Buildings and landmarks
Lake Northam, Victoria Park, Victoria Park Pool, Baxter's Lodge, Fisher Tennis courts, Fisher Library, Fisher Library Stack, New Law Building, Law School Carpark, New Law Annexe, Eastern Avenue Auditorium and Theatre Complex, Carslaw Building, Wentworth Building, Jane Foss Russell Building, Holme Building, Student Centre, Verge Gallery, Urbanest, Tin Sheds Gallery, Wilkinson Building, WH+Maze Building, Agricultural Glasshouse, International House, Seymour Centre, The School of Information Technologies, Aeronautical Engineering Building, Mechanical Engineering Building, Engineering Link Building, Rose Street Building, PNR Building, Electrical Engineering Building, Chemical Engineering Building, Civil and Mining Engineering Building, Civil Engineering Workshop, Old School Building, Cadigal Green, Gordon Yu-Hoi Chiu Building, Tennis courts, Noel Martin Sports & Aquatic Centre, Services Building, ICT, 316 Abercrombie Street, 378 Abercrombie Street, Mandelbaum House, Abercrombie Student Accommodation, Abercrombie Building Business School, Codrington Building, Darlington Road Terraces, Merewether Building, Institute Building, Stone Dixon Wing, The Darlington Centre School Building, The Darlington Centre, Darlington House, IXL Garage, Regiment Building, Molecular Bioscience Building, Gatekeeper's Lodge (City Road), Moore Theological College, St Paul's Oval, St Paul's College, Women's College, Wesley College, St Andrew's Oval, Carillon Ave KU Carillon Child Care Centre, Gatehouse, Tennis court, Western Avenue Carpark, Bligh Building, Sydney University Village, Darling Building, Centre for Continuing Education, St Andrew's College, Royal Prince Alfred Hospital, Centenary Institute, Charles Perkins Centre research and education hub, Bosch Building 1A, Bosch Building 1B, The Bosch Glasshouse, Victor Coppleson Building, Blackburn Building, Bruce Williams Pavilion, University Oval No.1, University Oval No.2, Oval No.2 Grandstand, JD Stewart Building, McMaster Building, The Round House, Veterinary Science Conference Centre, McMaster Annex, RMC Gunn Building, Evelyn Williams Building, Gatekeeper's Lodge, Sand Rob House, St John's Oval, St John's College, Sancta Sophia College, Queen Mary Building Student Accommodation, Medical Foundation Building, Information Centre, Great Hall, University Art Gallery, The Quadrangle, Nicholson Museum, Botany Lawn, Mackie Building, Macleay Museum, MacLaurin Hall, Anderson Stuart Building, Chemistry Lecture Hall, Chemistry Building, Transient Building, Madsen Building, Edward Ford Building, Physics Building, Sydney Nanoscience Hub, The Square, Education Building, Education Building Annex, Old Teachers' College, The Arena Sports Centre, Manning House, RC Mills Building, Squash courts, Lawn tennis courts, Pharmacy and Bank Building, Brennan/MacCallum Building, Badham Building, Griffith Taylor Building, Footbridge Theatre, Margaret Telfer Building, Mackie Building, Heydon-Laurence Building, RD Watt Building, Wallace Theatre, John Woolley Building, Demountable Village, Selle House, 13 Ross Street, KU Laurel Tree House Child Care Centre, Edgeworth David Building

ORPHANS

Food outlets within 10 min walk

Wentworth Building & Jane Foss Russell Building
Subway, Indian, Chinese, Kebab, Italian

Poolside Cafe
Cafe

The Royal
Pub lunch

Abercrombie Terrace
Cafe

King St, Newtown
Thai lunch specials
(10 min walk)

Sign In

PNR Lecture Theatre

Engineering

Sydney Uni Sports & Aquatic Centre

Wentworth Building

Merewether Building

The University of Sydney Business School

Royal Hotel

Carriageworks

The University of Sydney

St Paul's College

The Women's College

Wesley College

Western Ave

Fisher Rd

Darlington Rd

Darlington Ln

Abercrombie St

Shepherd St

Wilson St

Wilson Ln

Lander St

Lander Ln

Maze Cres

Forbes St

Forbes Ln

Queen St

Bennett St

Carriageworks Way

Google

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