



Australian Rivers Institute



中国科学院武汉植物园

中国科学院水生植物与流域生态重点实验室

Key Laboratory of Aquatic Botany and Watershed Ecology, Chinese Academy of Sciences

## Short course: Biomarkers in Aquatic Food Web Research

**Dates:** Sunday 7<sup>th</sup>- Friday 12<sup>th</sup>, April 2019

**Program:** 6 days (the first day for registration and welcome)

**Venue:** # 201 Jiufeng Road No. 1, Wuhan, Hubei Province, China

**Number of participants:** 25-30 max

**Program fee per Student:** 4000 RMB before 20 March 2019; 4200 RMB after 20 March 2019

### Instructors:

- [\*\*Emeritus Professor Brian Fry\*\*](#), Australian Rivers Institute, Griffith University
- [\*\*Professor Martin Kainz\*\*](#), Wassercluster, Lunz
- [\*\*Professor Stuart Bunn\*\*](#), Australian Rivers Institute, Griffith University

## **Aims of the course:**

The course provides an introduction to the application of stable isotopes and other biomarkers to the study of aquatic food webs, through a combination of lectures and discussion sessions, data analysis workshops and reviews of recent papers. We will emphasise the importance of critical thinking in setting research questions and designing field sampling and laboratory experiments to address them. We will discuss limitations of the use of biomarkers and provide examples to highlight important considerations for field collection, laboratory processing, and data analysis and interpretation. Finally, we will discuss future challenges and opportunities.

## **Who should apply:**

The course is designed for PhD students and postdoctoral fellows who are undertaking research on aquatic food webs and have an interest in the application of biomarkers. Participants must have qualifications in ecology or biology, with a sound knowledge of chemistry or biochemistry. Lectures and discussions will be in English (we will assume that all participants have an IELTS equivalent of at least 6.0 for reading and speaking). The course will be highly interactive and participants will be expected to actively contribute to the discussions.

The links: [Wuhan Botanical Garden, Chinese Academy of Sciences \(CAS\)](#);

[Australian Rivers Institute \(ARI\), Griffith University](#)

[Wassercluster-Lunz](#);

## **Course fee includes:**

- Welcome and Farewell dinners
- Lunch box
- Coffee and tea breaks
- Certificate of participation
- Tuition (at lecture room and in the field)
- Internet service at classroom

## **Course fee does not include:**

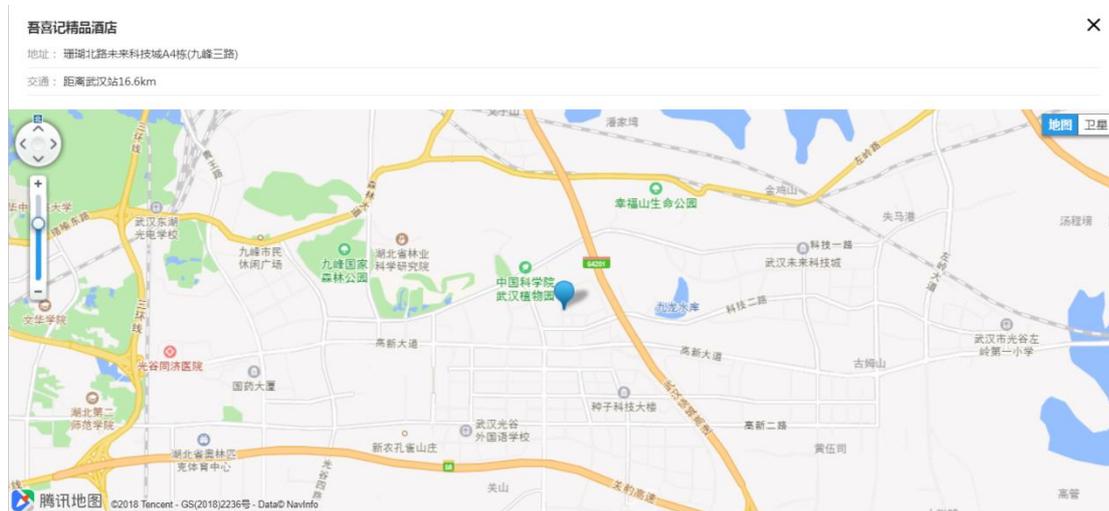
- Accommodation
- Travel to/from Wuhan
- Meals with the exception of those listed above

**Registration time:** 3:30 pm- 17:00 pm on 7 April 2019.

**Registration venue:** The lobby of Wuxiji boutique hotel.

The hotel we recommend is Wuxiji Boutique Hotel (吾喜记精品酒店, Tel: +86 27 8778 9999, Price: 200-350 RMB/Day). Students can take short walk of 15 mins to the Wuhan Botanical Garden (201 Jiufeng Road No. 1, Wuhan) if they stay in Wuxiji Boutique hotel.

Hotel address: No. 999 Gaoxin Avenue, New Technology Development Zone, near Coral Road (N)



## Course outline

### Come prepared:

**Participants should send a short paragraph** (2 or 3 sentences only) of the goal of their current research and what general questions they are seeking to answer.

The following review papers will provide valuable background and **we expect all participants to read them before the course** (copies will be provided).

- Peterson, B.J. and Fry B. (1987). Stable isotopes in ecosystem studies. *Annual Review of Ecology and Systematics* **18**, 293-320.
- Napolitano, G.E. (1999). Fatty acids as trophic and chemical markers in freshwater ecosystems. In: Arts, M.T. and Wainman, B.C. *Lipids in Freshwater Ecosystems*. pp 21-44.

These and other key papers (listed below) will be discussed during the workshop.

- Jardine, T.D., Pusey, B.P., Hamilton, S.K., Pettit, N.E., Davies, P.M., Sinnamon, V., Halliday, I.A. and Bunn, S.E. (2012). Fish mediate high food web connectivity in the lower reaches of a tropical floodplain river. *Oecologia* **168**, 829-38.
- Rasmussen, J.B. (2010) Estimating terrestrial contribution to stream invertebrates and periphyton using a gradient-based mixing model for delta 13C. *Journal of Animal Ecology* **79**, 393-402.
- Vander Zanden, M.J. and Vadeboncoeur, Y. (2002). Fishes as integrators of benthic and pelagic food webs in lakes. *Ecology* **83**, 2152-2161.
- Hamilton, S.K., Sippel, S.J. and Bunn, S.E. (2005). Separation of algae from detritus for stable isotope or ecological stoichiometry studies using density fractionation in colloidal silica. *Limnology and Oceanography Methods* **3**, 149-157.

**Proposed program:**

Session	Sunday 4 <sup>th</sup>	Monday 5 <sup>th</sup>	Tuesday 6 <sup>th</sup>	Wednesday 7 <sup>th</sup>	Thursday 8 <sup>th</sup>	Friday 9 <sup>th</sup>
		Isotopes and aquatic food webs	Designing your study	Field exercise	Interpreting your data	Future opportunities
08:30-10:00		Introduction: Aims of the course and program outline	A grand challenge: 'Restoring East Lake' <ul style="list-style-type: none"> <li>• Setting objectives</li> <li>• Development of conceptual models</li> <li>• Defining key questions</li> </ul>	Putting your sampling design into practice. What will you measure and how? Identify potential problems and limitations	Data analysis and interpretation	Future opportunities Other biomarker approaches
		Introduction to aquatic food webs				
10:00-10:30		BREAK			BREAK	
10:30-12:00		Stable isotopes '101'	<ul style="list-style-type: none"> <li>• Examples - case studies</li> </ul>			
12:00-13:30		LUNCH BREAK				
13:30-15:00		Stable isotopes in food web studies	3 groups: 'Designing your food web study' <ul style="list-style-type: none"> <li>• What specific questions to address?</li> <li>• What will you measure and how?</li> </ul>	Presentations from each of three groups <ul style="list-style-type: none"> <li>• Question addressed</li> <li>• Sample design</li> <li>• Methods used</li> </ul>	Group exercise – some case studies	Discussion of selected projects
15:00-15:30	BREAK					
15:30-17:00	Arrival and registration	Fatty acids and other biomarkers	Wrap-up: <ul style="list-style-type: none"> <li>• Planning for field day</li> <li>• What to prepare?</li> </ul>	Wrap-up: <ul style="list-style-type: none"> <li>• Key issues and common problems</li> </ul>	Presentations (3 groups) and group discussion	Final discussions, wrap-up
Evening	Welcome dinner and introductions					Dinner and presentation of certificates

Group activities	
Lectures	
Free time	

## Notes:

If you are interested in this course, what you can do for registration:

1. Fill in the form (attachment 1<sup>st</sup>) and send it to [WuhanBiomarker@163.com](mailto:WuhanBiomarker@163.com);
2. Payment (the information you need, please find in the form in attachment 1<sup>st</sup>);
3. Please forward the receipt to the email address [WuhanBiomarker@163.com](mailto:WuhanBiomarker@163.com). Please note us: Tuition fee for 'Biomarkers in aquatic food web research (the name of trainee)'.

If you need assistance, please do not hesitate to contact Mr. Yiwei Yang, email address is [WuhanBiomarker@163.com](mailto:WuhanBiomarker@163.com), Wechat ID is double\_mie; His mobile number is +86 156 2336 7623.

If you need further assistance, please do not hesitate to contact Dr. Xiang Tan, email address is [xtan@wbcas.cn](mailto:xtan@wbcas.cn), Wechat ID is BenvaTan.