# A Practical Introduction to Ecological Modelling

13th-15th July 2016

Life Sciences building (room G08), University of Bristol

(Dr. Ben Ward / University of Bristol / b.a.ward@bristol.ac.uk)
(Dr. Fanny Monteiro / University of Bristol / f.monteiro@bristol.ac.uk)
(Prof. Andy Ridgwell / University of Bristol & UC-Riverside / andy@seao2.org)

Marine ecosystems and their environment are strongly interdependent. Biological production and the subsequent transformation and transport of organic matter regulate the physical and chemical environment, which in turn feeds back on biological communities and their productivity. Past and future changes in the Earth system therefore need to be understood in terms of these two coupled systems.

This summer school will address key aspects of marine ecosystems and their role in the Earth system. In particular, we will focus on the links between the structure and biogeochemical function of marine microbial communities in the framework of a coupled Earth system and marine ecosystem model. Questions we will investigate include:

- What are the key links between plankton community structure, biogeochemical function and climate?
- How can the holistic system response be constrained by contemporary physiological and biogeochemical data?
- What techniques are available in terms of modelling the key dynamics of marine ecosystems?

The course will be taught by experts in ecology, biological oceanography, and Earth system science, from cellular to global scales. A central objective will be to introduce the current state-of-the-art, and to identify exciting new directions for ongoing research.

Food and refreshments will be provided on all days. There will be a vaguely organised outing to the pub on Wednesday evening for beer/food (is there a difference?). Thursday evening is more 'free-form'.

***The summer school will take place in the Life Sciences Building which is on 24 Tyndall Avenue, BS8 1TQ (see attached maps). There will be a porter at the entrance to let you in. The lectures will take place in G13/G14 and the computer room (which is next door) is G08.***

## Day 1 (Wednesday 13th July) – Introduction to Earth system modelling

*START (9 am)*

09:00-12:30 ***Practical Session* – Introduction to the ocean carbon cycle in GEnIE** (Andy Ridgwell)

12:30-13:30 **LUNCH**

13:30-14:15 ***Lecture* – Processes and patterns of oceanic nutrient limitation** (Mark Moore)

14:15-15:00 ***Lecture* – The biological carbon pump: magnitude, variability and controls** (Steph Henson)

15:00-15:15 **COFFEE**

15:15-17:00 ***Practical Session* – More fun with GEnIE** (Andy Ridgwell)

17:00-17:45 ***Lecture* – Ocean biogeochemistry and the silicon cycle** (Kate Hendry)

*END (ca. 6 pm) (+ pub meal)*

## Day 2 (Thursday 14th July) – Ecological modelling

*START (9 am)*

09:00-09:45 ***Lecture* – Pelagic diversity and biogeography** (Pincelli Hull)

09:45-10:30 ***Lecture* – Phytoplankton cell size, metabolism and community structure** (Emilio Maranon)

10:30-10:45 **COFFEE**

10:45-11:30 ***Lecture* – Resource competition theory** (Chris Klausmeier)

11:30-12:15 ***Lecture* – Plankton traits and the ecological niche** (Elena Litchman)

12:15-13:15 **LUNCH**

13:15-14:00 ***Practical Session* – Modelling marine ecosystems and the biological pump** (Ben Ward)

14:00-18:00 ***Practical Session* – Ecosystems in GEnIE** (Ben Ward)

*END (ca. 6 pm) (+ pub?)*

## Day 3 (Friday 15th July) – Project work

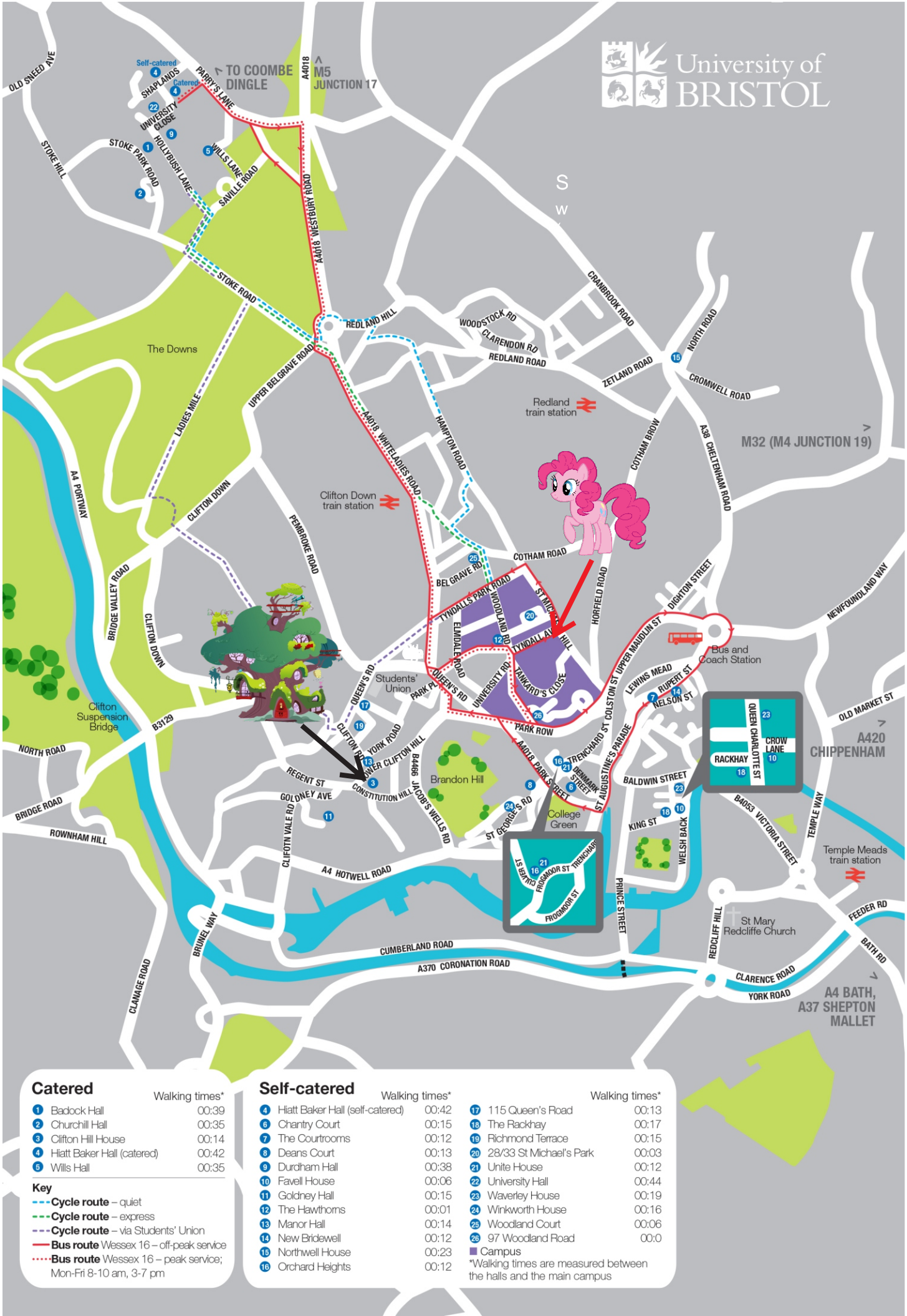
*START (9 am)*

09:00-09:45 ***Lecture* – Past changes in ocean biogeochemistry** (Fanny Monteiro)

09:45-16:00 ***Practical Session* – Ecosystems in GEnIE** [student projects]

*END (ca. 4 pm)*


accommodation (Clifton Hill treehouse)
(Life Sciences building, room G08)
fun
(workshop venue)
other transport related dragons
here be dragons
(and trains that don't run on time)
To the Botanic Garden, Canynge Hall, Coombe Dingle Sports Centre and Southmead Hospital
M5, MIDLANDS AND THE SOUTH WEST
A38, M5 SOUTH, BRISTOL AIRPORT
The School of Veterinary Science at Langford is 14 miles south-west of Bristol
SAT NAV BS40 5DU
Bristol
Bristol Airport
Langford
A38
91
ABERDEEN ROAD
COTHAM HILL
COTHAM ROAD
HAMPTON ROAD
COTHAM ROAD SOUTH
PORTLAND STREET
ALFRED PLACE
BELGRAVE RD
OAKFIELD ROAD
OAKFIELD GR
WHITELADIES ROAD A4018
TYNDALL'S PARK ROAD
ST MICHAEL'S HILL
MYRTLE ROAD
BBC
PRIORY ROAD
ELMDALE ROAD
WOODLAND ROAD
ST MICHAEL'S PARK
SOUTHWELL STREET
HORFIELD ROAD
TYNDALL AVENUE
ELTON ROAD
ST PAUL'S ROAD
Victoria Rooms
Senate House
Bristol Grammar School
St Michael's Hospital
Bristol Royal Infirmary
Bus and Coach Station
MARLBOROUGH STREET
EARL ST
WHITSON ST
UPPER MAUDLIN STREET
LOWER MAUDLIN STREET
QUEEN'S ROAD
QUEEN'S AVE
RICHMOND HILL
RICHMOND HILL AVE
QUEEN'S ROAD A4018
Students' Union Richmond Building
Wills Memorial Building
UNIVERSITY ROAD
UNIVERSITY WALK
ROYAL FORT RD
Royal Fort Gardens
TANKARDS CLOSE
CANTOCKS CLOSE
MEDICAL AVENUE
PERRY ROAD
RUPERT STREET
NELSON STREET
GORDON ROAD
TERRACE
RICHMOND
A4018
TRIANGLE SOUTH A4018
BERKELEY SQUARE
PARK STREET A4018
PARK ROW
LODGE ST
TRENCHARD STREET
COLSTON STREET
COLSTON AVENUE
BROAD ST
CORN STREET
BALDWIN STREET
UNITY STREET
DENMARK STREET
Bristol Hippodrome
GREAT GEORGE STREET
Brandon Hill
JACOBS WELLS ROAD
ST GEORGE'S ROAD
COLLEGE GREEN A4018
City Hall
College Green
To Temple Meads train station and Engine Shed
P




## Catered

| | | Walking times* |
|---|---|---|
| 1 | Badock Hall | 00:39 |
| 2 | Churchill Hall | 00:35 |
| 3 | Clifton Hill House | 00:14 |
| 4 | Hiatt Baker Hall (catered) | 00:42 |
| 5 | Wills Hall | 00:35 |

**Key**

- **Cycle route** – quiet
- **Cycle route** – express
- **Cycle route** – via Students' Union
- **Bus route** Wessex 16 – off-peak service
- **Bus route** Wessex 16 – peak service; Mon-Fri 8-10 am, 3-7 pm

## Self-catered

| | | Walking times* |
|---|---|---|
| 4 | Hiatt Baker Hall (self-catered) | 00:42 |
| 6 | Chantry Court | 00:15 |
| 7 | The Courtrooms | 00:12 |
| 8 | Deans Court | 00:13 |
| 9 | Durdham Hall | 00:38 |
| 10 | Favell House | 00:06 |
| 11 | Goldney Hall | 00:15 |
| 12 | The Hawthorns | 00:01 |
| 13 | Manor Hall | 00:14 |
| 14 | New Bridewell | 00:12 |
| 15 | Northwell House | 00:23 |
| 16 | Orchard Heights | 00:12 |
| 17 | 115 Queen's Road | 00:13 |
| 18 | The Rackhay | 00:17 |
| 19 | Richmond Terrace | 00:15 |
| 20 | 28/33 St Michael's Park | 00:03 |
| 21 | Unite House | 00:12 |
| 22 | University Hall | 00:44 |
| 23 | Waverley House | 00:19 |
| 24 | Winkworth House | 00:16 |
| 25 | Woodland Court | 00:06 |
| 26 | 97 Woodland Road | 00:0 |

■ Campus

*Walking times are measured between the halls and the main campus