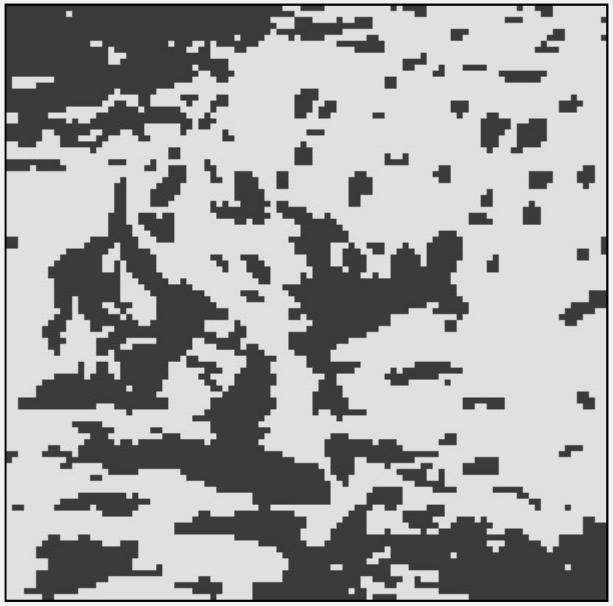
Department of Computer Science
University of Bristol

COMS30121 - Image Processing and Computer Vision

www.ole.bris.ac.uk/bbcswebdav/courses/COMS30121_2017/content



Lecture 01

Introduction

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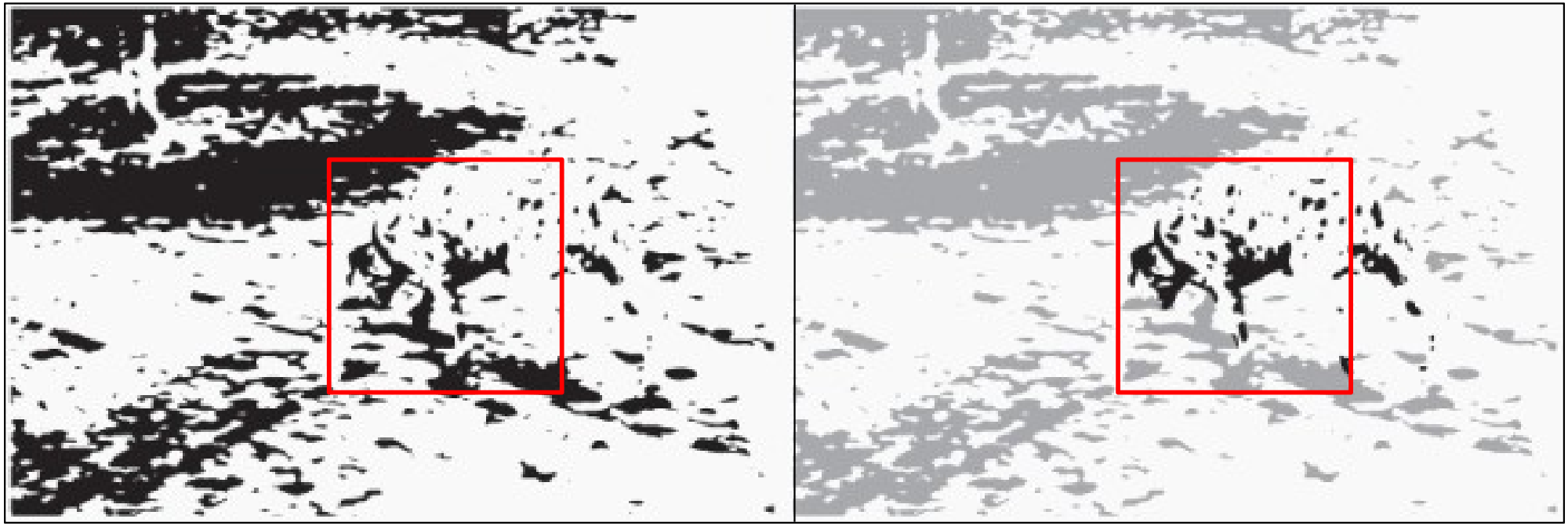
Tilo Burghardt | tilo@cs.bris.ac.uk

13 Slides

What is Computer Vision?



Computer Vision ... attempts bridging the semantic gap between picture elements [pixels] and meaning

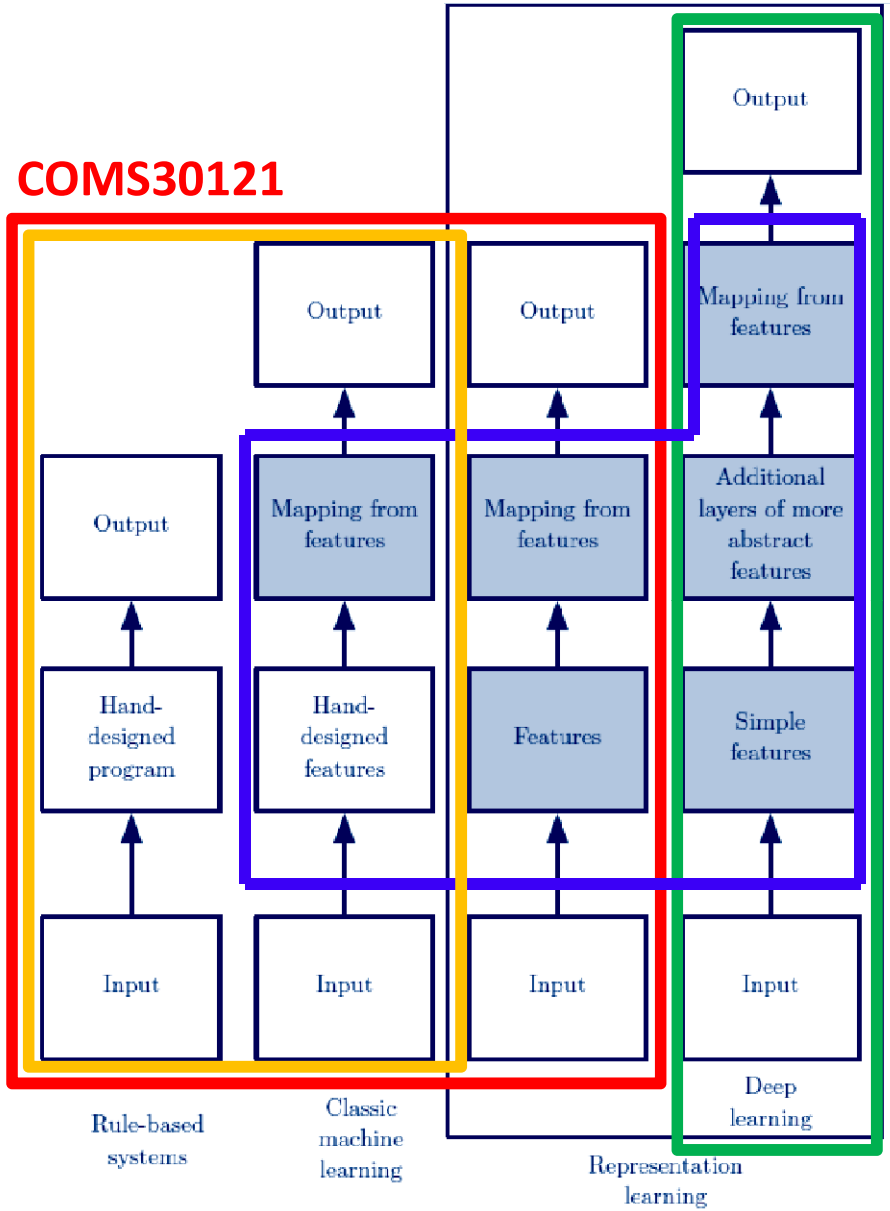
What is Computer Vision?

Pixels	Features	Models	Meaning

Computer Vision ...

... concerns the study of the theory, engineering and application of artificial systems that extract semantic information from images or other structured, multidimensional data.

The Unit in its Machine Learning Context



Source modified from: Ian Goodfellow, www.deeplearningbook.org

What will we teach in the subject?

A first introduction to classical computational vision: the theory, principles, techniques, algorithms and applications.

The unit is structured in terms of topics. For each topic, we cover the basics of the underlying theory, some practical challenges, important algorithms, and example applications.

Lectures	Seminars	Lab Sessions
principles	**worksheets**	**coursework/project**
algorithms	**discussions**	**implementation**
context	**examples**	**evaluation**

Self Study

Unit Topics in a Nutshell

- Acquisition and Representation
- Image Transforms
- Edges and Shape
- Segmentation
- Object Detection
- Motion Analysis
- Stereo Vision

Some Suggestions for General Reading

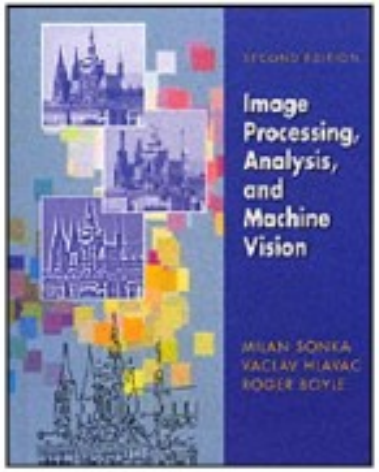
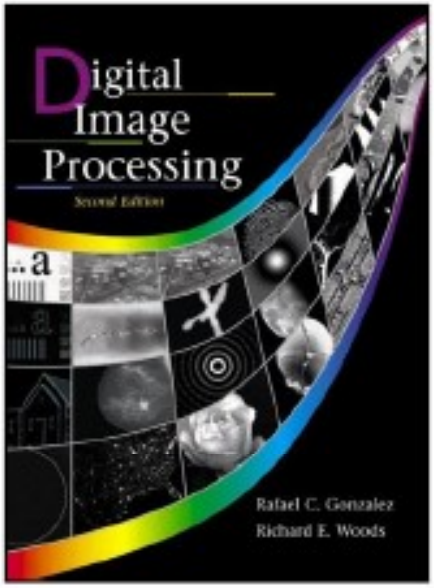
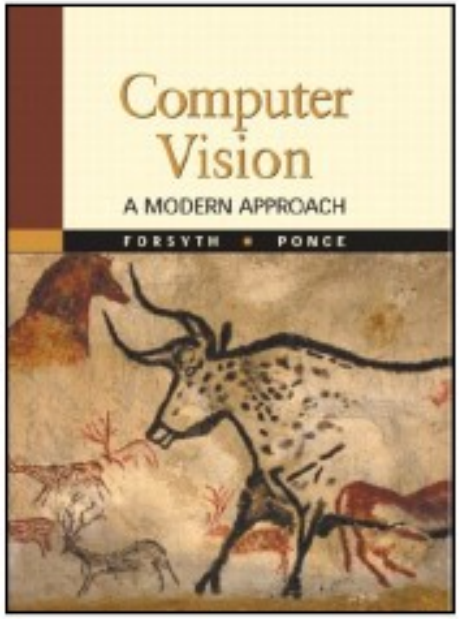


Image Processing Analysis and Machine Vision by Sonka, Boyle and Hlavac



Digital Image Processing by Gonzalez and Woods



Computer Vision: A Modern Approach by Forsyth and Ponce

Practical Aspects

’Learning by Doing’

... you learn by implementing algorithms and experimenting with them, e.g. evaluating their performance.

Implementations will be done using OpenCV, which is open-source and available freely for most platforms and languages.

We suggest you install it on your own machines.

You can choose to work on your platform in a language you are most fluent in (at your own risk!); **we will only provide support for the MVB2.11 lab setup and the C++ interface of OpenCV**.

You will work in pairs during the lab sessions and courseworks.
TASK: Form pairs and register online at the end of this lecture.

Unit Assessment

Coursework (50%)

- you will work in pairs on small projects
- there will be weekly formative lab feedback
- one final summative assessment will cover a lab presentation of your team project, its implementation and documentation

Exam - January 2018 (50%)

The Unit Website

Central Hub for all Learning Sessions, Materials, Courseworks, ...

www.ole.bris.ac.uk/bbcswebdav/courses/COMS30121_2017/content

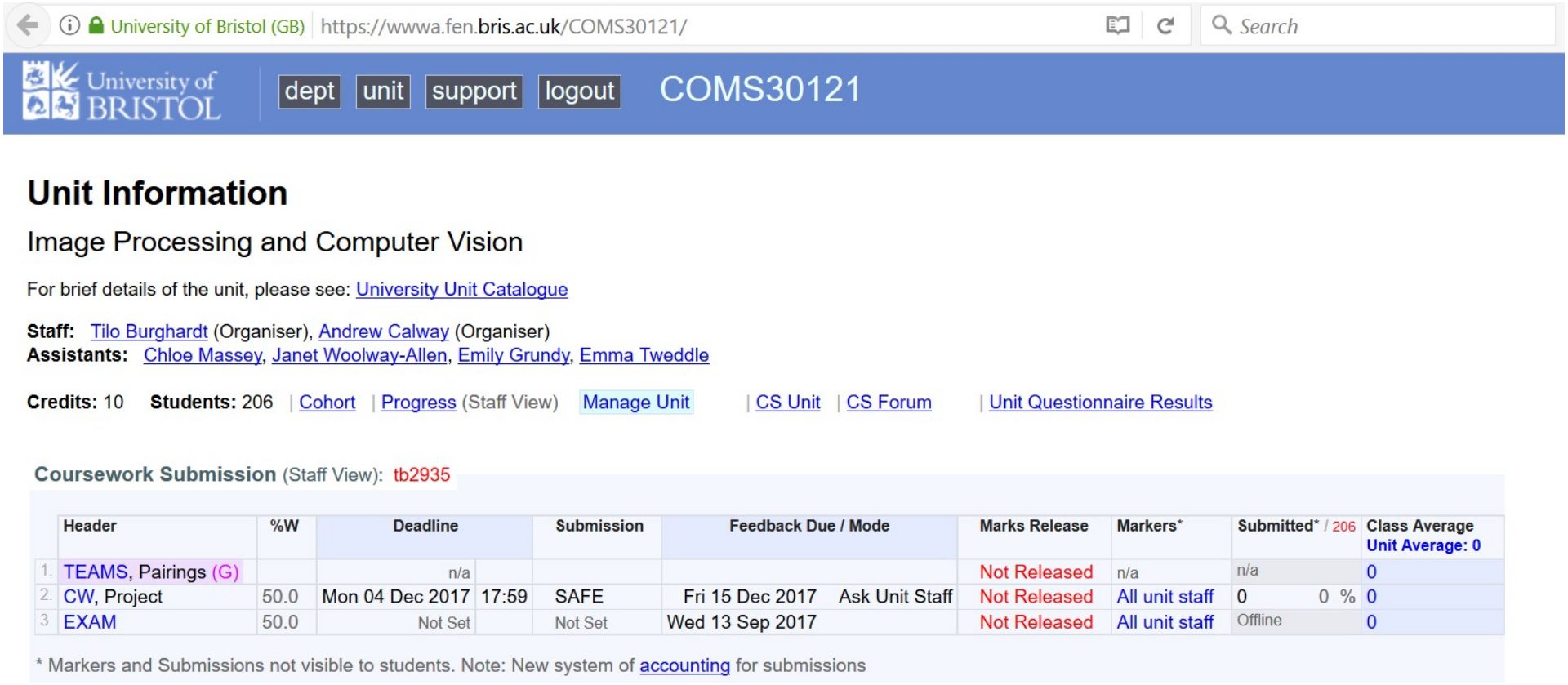
MATERIALS: Lecture Notes, Worksheets, Courseworks

WEEK	LECTURES	SEMINARS	LABS
01	Mon 25/09/2017, QB 1.40 PUGSLEY, 12noon **LECTURE 01 - INTRODUCTION** Topic: What is Computer Vision? (No Tuesday seminar in week 1) **-- TEAM SIGNUP --** Signup as a pair for ONE lab slot with your TWO comma-separated usernames in the participant field. Deadline is end of Mon 25/09/17, 23:59. Then turn up to the lab slot you signed up for. Links related to Demos (only for interest): Website: Visual Information Laboratory at Bristol Website: Textureless Object Detector Paper Classic: Viola-Jones Face Detection Helpful Links to Get Started: Working Remotely using Snowy or MVB2.11 Lab Machines New to Linux? - A Hands-on Linux Tutorial		**Group A:** Tue 26/09/2017, 9am-11pm, MVB2.11 **Group B:** Thu 28/09/2016, 9am-11am, MVB2.11 **LAB 01: Introduction to OpenCV Basics** Part 1: Lab Setup and getting started... Part 2: Thresholding images... Example OpenCV Code (C++): hello.cpp, load.cpp, draw.cpp, pixels.cpp, thr.cpp Resources and Materials: Example Script .bashrc for MVB2.11, mandrill.jpg, mandrillRGB.jpg, OpenCV `threshold` function, OpenCV `inRange` function External Link: Download OpenCV External Link: OpenCV Manual

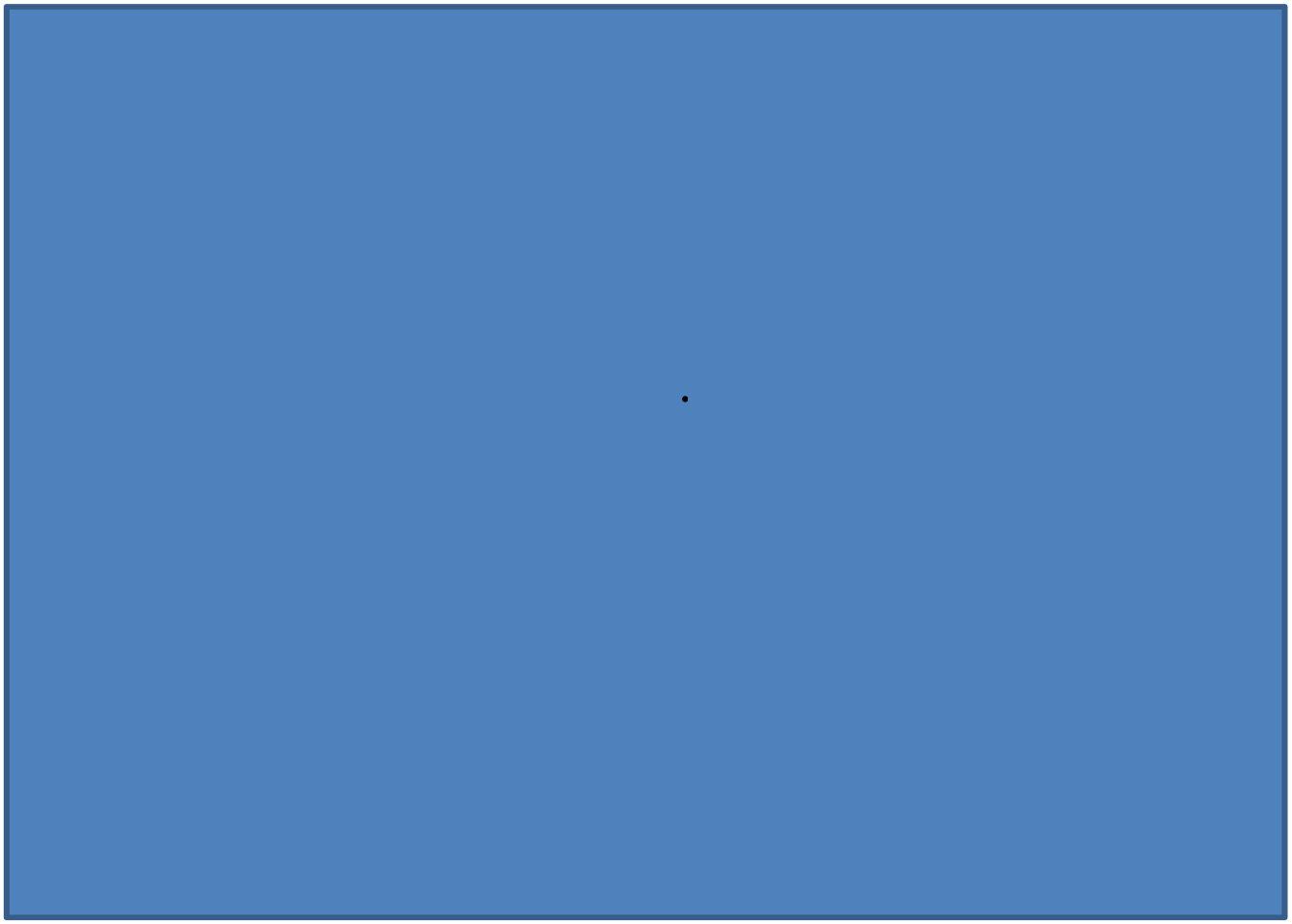
SAFE Submission and Deadlines

Central Hub for Coursework Submissions ...

wwwa.fen.bris.ac.uk/COMS30121



Demo Applications



Don‘t leave the room without having registered a team!

’Team Formation’

Signup as a PAIR for ONE lab slot with your TWO comma-separated usernames in the participant field. Then turn up to the lab slot you signed up for.

Use the link on the website:

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...or directly via this doodle link:

https://doodle.com/poll/enrv95gzspg42dcs

TASK: You have to signup TODAY – labs start tomorrow!