

# Specialized Design Course in Silicon Photonics

## MONDAY 17<sup>th</sup> June 2019:

### **BASIC CONCEPTS**

#### **09:00 to 12:30**

- Introduction to the course
- Introduction to photonic ICs, silicon photonics
- Hands-on: Basics of Jupyter notebooks, Python
- Hands-on: Waveguides: dispersion, non-linearity , sensitivity

#### **13:30 to 17:00**

- Design flow of silicon Photonic ICs
- Circuit design and simulations (frequency and time domain)
- Hands-on: Constructing circuits
- Hands-on: Circuit simulation
- Australian Silicon Photonics
- **Group picture** in coffee break

## TUESDAY 18<sup>th</sup> June 2019

### **DESIGN FLOW**

#### **09:00 to 12:30**

- Introducing the tape-outs and PDKs
- Hands-on: Exploring the PDKs and the PICAZZO library
- Hands-on: Setting up the project
- Hands-on: Directional coupler building blocks
- The Silicon Photonics ecosystem

#### **13:30 to 17:00**

- Parametric cells (PCells)
- Parametric and custom layout
- Simulation models for components
- Hands-on: PCells , Layout and Models

#### **Evening Activity (Food provided)**

- Using Lean techniques in a Fabless environment
- Hands-on: Playing the “Fab game”

## WEDNESDAY 19<sup>th</sup> June 2019

### **FILTERS AND CUSTOM COMPONENTS**

#### **09:00 to 12:30**

- Optical Wavelength Filters: Interferometers, AWGs and echelle gratings
- Hands-on: Designing filters

**WEDNESDAY 19<sup>th</sup> June 2019**

**FILTERS AND CUSTOM COMPONENTS (CTD)**

**13:30 to 17:00**

- Component design and electromagnetic simulation
- Hands-on: Designing Filters (continued)
- Hands-on: component designs, simulations and optimizations

**Evening Activity (Food provided)**

- Organizing your design team
- Design of Experiment
- Hands-on - Idea-generation for project designs

**THURSDAY 20<sup>st</sup> June 2019**

**PREPARATION FOR TAPE-OUT**

**09:00 to 12:30**

- CMOS Process Technology (for photonics)
- Hands-on: Design Rule Checking

**13:30 to 16:00**

- Hands-on: Project Work and Exercises

**After 16:30:** Visit to the “Castle of the Counts”

**18:30 onwards:** Course dinner

**FRIDAY 21<sup>nd</sup> June 2019**

**PROJECT DESIGN AND DATA ANALYSIS**

**09:00 to 12:30**

- Design for Manufacturability
- Variability and parasitics
- Hands-on: Tape-out process and design verification
- Hands-on: Photonic parasitics
- Hands-on: Variability analysis

**13:30 to 17:00**

- Analysis of measurement data
- Hands-on: Data analysis and parameter extraction
  
- Present your project
- Wrap up.