

## SCIENTIFIC PROGRAMME

## Course Director

Søren M. Bentzen (USA)

## Faculty

Ane L. Appelt (UK)

C. David Fuller (USA)

Johannes A. Langendijk (NL)

Ivan R. Vogelius (DK)

## Guest Lecturer

Richard Pötter (AT)

## Virtual pre-meeting: Thursday, November 14, 2024

| Time              | Lecture                             | Speaker |
|-------------------|-------------------------------------|---------|
| 16:00-17:00 (CET) | Course presentation and preparation | Faculty |

## DAY 1 – Sunday, December 1, 2024

| Time                                                | Lecture                                                                        | Speaker                |
|-----------------------------------------------------|--------------------------------------------------------------------------------|------------------------|
| 8:15 - 9:00                                         | Registration & Course Intro                                                    |                        |
| <b>Theme 1: Dose-response and Outcomes Modeling</b> |                                                                                |                        |
| 9:00 - 09:45                                        | Intro – Models and Modeling                                                    | Søren M. Bentzen       |
| 09:45 - 10:30                                       | Dose-response models                                                           | Ane L. Appelt          |
| 10:30 - 11:00                                       | Coffee/Tea break                                                               |                        |
| 11:00 - 11:30                                       | NTCP models                                                                    | Ane L. Appelt          |
| 11:30 - 12:15                                       | Evaluation and validation of models                                            | Ivan R. Vogelius       |
| 12:15 - 13:00                                       | Hot topic: Model-based selection of patients for proton therapy                | Johannes A. Langendijk |
| 13:00 - 14:00                                       | Lunch                                                                          |                        |
| <b>Theme 2: Working with Data</b>                   |                                                                                |                        |
| 14:00 - 14:45                                       | Data sharing - why and how                                                     | David Fuller           |
| 14:45 - 15:45                                       | Practical exercise: Osteoradionecrosis modeling                                | Faculty                |
| 15:45 - 16:15                                       | Pitfalls in statistical coding and promise and perils of large language models | Bentzen and Vogelius   |
| 16:15 - 16:45                                       | Coffee/Tea break                                                               |                        |
| 16:45-18:00                                         | Meet-the-professor - Bring Your Own Science                                    | Attendees/All faculty  |

## DAY 2 – Monday, December 2, 2024

| Time                         | Lecture                                                               | Speaker          |
|------------------------------|-----------------------------------------------------------------------|------------------|
| 8:30 - 9:00                  | Summary & Intro                                                       |                  |
| <b>Theme 3: Statistics I</b> |                                                                       |                  |
| 9:00 - 09:45                 | Intro and parameter estimation/model fits                             | Ivan R. Vogelius |
| 09:45 - 10:30                | Statistical estimation: regression, correlation & survival statistics | Søren M. Bentzen |
| 10:30 - 11:00                | Coffee/Tea break                                                      |                  |
| 11:00 - 11:45                | Cox PHM                                                               | Søren M. Bentzen |
| 11:45 - 12:30                | Exercise: Sample size & power                                         | Ivan R. Vogelius |

|                            |                                                          |                        |
|----------------------------|----------------------------------------------------------|------------------------|
| 12:30 - 13:00              | Bayesian statistics                                      | Søren M. Bentzen       |
| 13:00 - 14:00              | Lunch                                                    |                        |
| Theme 4: Clinical trials I |                                                          |                        |
| 14:00 - 14:45              | Clinical trials in Radiation Oncology                    | Johannes A. Langendijk |
| 14:45 - 15:30              | Novel trial designs, adaptive designs, biomarkers trials | Søren M. Bentzen       |
| 15:30 - 16:15              | Testing new technologies                                 | C. David Fuller        |
| 16:15 - 16:45              | Coffee/Tea break                                         |                        |
| 16:45 - 18:00              | Elective block – topics proposed by attendees            | All faculty            |

### DAY 3 – Tuesday, December 3, 2024

| Time                                                               | Lecture                                                 | Speaker                |
|--------------------------------------------------------------------|---------------------------------------------------------|------------------------|
| 8:30 - 9:00                                                        | Summary & Intro                                         |                        |
| Theme 5: Real world data and clinical embedded evidence generation |                                                         |                        |
| 9:00 - 09:45                                                       | Lessons from QUANTEC, Hytec and PENTEC                  | Søren M. Bentzen       |
| 09:45 - 10:30                                                      | Quantitative analysis of images                         | C. David Fuller        |
| 10:30 - 11:00                                                      | Coffee/Tea break                                        |                        |
| 11:00 - 12:15                                                      | Debate: real world data vs. randomization               | Attendees              |
| 12:15 - 13:00                                                      | Why most trials fail?                                   | Faculty                |
| 13:00 - 14:00                                                      | Lunch                                                   |                        |
| Theme 6: Performance metrics                                       |                                                         |                        |
| 14:00 - 14:45                                                      | Diagnostic tests, PPV, NPV, sensitivity and specificity | Ane L. Appelt          |
| 14:45 - 15:30                                                      | Endpoints for treatment outcome                         | Johannes A. Langendijk |
| 15:30 - 16:15                                                      | Models in clinical practice                             | C. David Fuller        |
| 16:15 - 16:45                                                      | Coffee/Tea break                                        |                        |
| 16:45 - 18:00                                                      | Group exercise: Designing a trial                       |                        |

### DAY 4 – Wednesday, December 4, 2024

| Time                         | Lecture                                                                           | Speaker                |
|------------------------------|-----------------------------------------------------------------------------------|------------------------|
| 8:30 - 9:00                  | Summary & Intro                                                                   |                        |
| Theme 7: Generating Evidence |                                                                                   |                        |
| 9:00 - 09:45                 | Guest lecture: EMBRACE as a model for clinical research                           | Richard Pötter         |
| 09:45 - 10:30                | An infrastructure for clinical radiation research                                 | Johannes A. Langendijk |
| 10:30 - 11:00                | Coffee/Tea break                                                                  |                        |
| 11:00 - 11:45                | Ethics and regulatory oversight (Workshop)                                        |                        |
| 11:45 - 12:30                | Data presentation + competing risks                                               | Ivan R. Vogelius       |
| 12:30 - 13:00                | How do early-career faculty in a busy clinic get involved in evidence generation? | Johannes A. Langendijk |
| 13:00 - 14:00                | Lunch                                                                             |                        |
| Theme 8: Concluding sessions |                                                                                   |                        |
| 14:00 - 14:45                | Meta-analysis                                                                     | Ivan R. Vogelius       |
| 14:45 - 15:30                | Pitfalls                                                                          | Søren M. Bentzen       |
| 15:30 - 16:00                | Course evaluation                                                                 |                        |