Short Course: **Molecular Epidemiology of Chronic disease and the Exposome**

Location: Utrecht / online

8-12 July 2024

**Course Co-Coordinators** Roel Vermeulen & Jelle Vlaanderen (IRAS, Utrecht University)

(L) lecture, (P) practical, (CT) course text

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Day** |  |  | **Topic** | **Speaker** | **Reading** |
| Monday 8 July  Morning | L  L | 10:00  10:30 | **Introduction Exposome and Molecular Epidemiology**  Introduction course and practical matters  Exposome and health: where chemistry meets biology (2x 45min) | Vlaanderen  Vlaanderen | **CT Chapter 1, 3, 6**  “The exposome: from concept to utility” C.P. Wild *Int j epidemiol* 2012.  “The exposome and health: Where chemistry meets biology” Vermeulen et al. *Science* 2020. |
| Monday 8 July  Afternoon | P  L | 13:00  14:00 | Computer lab I  *Introduction to working with OMICs data in R*  Computer lab II  *Variability in OMICs measurements* | Vorstenbosch/Oosterwegel  /Mallioris  Oosterwegel | **CT Chapter 9.** Environmental and occupational toxicants  **CT Chapter 14.** Population based designs in molecular epidemiology  **CT Chapter 19.** Cancer |
| Tuesday 9 July  Morning | L  L  L | 09:00  10:00  11:00 | Discussion computer lab II  Epigenetics and Transcriptomics in Exposome research  Metabolomics to study the exposome | Oosterwegel  Ibi  Dubbelman | **CT Chapter 7.** Platforms for biomarker analysis using high-throughput approaches in genomics, transcriptomics, proteomics, and bioinformatics. |
| Tuesday 9 July  Afternoon | L  P  P | 13:00  14:00  15:00 | Microbiome  Group exercise reading an Exposome paper  Group discussion Exposome paper | Bossers  Ibi / Vlaanderen  Ibi / Vlaanderen |  |
| **Day** |  |  | **Topic** | **Speaker** | **Reading** |
| Wednesday 10 July  Morning | L | 10:00  11:30 | Introduction into statistical methods to study the Exposome  Computer lab III  *Statistical analysis of OMICS data in Environmental Health* | Marc Chadeau-Hyam (ICL)  Vorstenbosch/Oosterwegel  /Mallioris | “Deciphering the Complex: Methodological Overview of  Statistical Models to Derive OMICS-Based Biomarkers” Chadeau-Hyam et al. *Environ Mol Mutagen* 2013.  **CT Chapter 8.** Measurement error in biomarkers: sources, assessment, and impact on studies |
| Wednesday 10 July  Afternoon | P | 13:30 | Computer lab III continued | Vorstenbosch/Oosterwegel  /Mallioris |  |
| Thursday 11 July  Morning | L  P | 10:00  11:00 | Discussion Computer lab III  Computer lab IV  *Variable selection and dimension reduction* | Portengen  Vorstenbosch/Oosterwegel  /Mallioris |  |
| Thursday 11 July  Afternoon | P  L | 15:00  16:00 | Discussion Computer lab IV  Mendelian randomization in Exposome research | Portengen  Thio |  |
| Friday 12 July  Morning | L  P | 10:00  11:00 | Bioinformatics  Computer lab practical work V  *Pathway enrichment* | Arshi  Vlaanderen /Arshi | **CT Chapter 27**. Future perspectives on molecular epidemiology |
| Friday 12 July  Afternoon | L  **E** | 13:00  **14:00**  **15:00** | Discussion OMICS practical work V  Time to prepare for exam  EXAM | Vlaanderen / Arshi |  |