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Zwep, L.B.

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Statistical learning for complex data to enable precision medicine strategies

Laura B. Zwep

1. Integration of statistical learning and pharmacometric modeling is vital for identifying molecular biomarkers for tumor growth inhibition from high-dimensional omics data. *This thesis.*
2. Longitudinal measurements in high-dimensional metabolomics data allow for detection of biomarkers patterns for disease progression and drug response. *This thesis.*
3. Collateral effects of antibiotic resistance can be detected in population surveillance data. *This thesis.*
4. Copulas can be used to share realistic patient covariate sets without sharing observed patient data. *This thesis.*
5. The process of building models based on previous knowledge is inherently Bayesian. *Adapted from Jeffrey S. Barrett, et al., 2008.*
6. The relative scarcity of big data limits the utility of artificial intelligence techniques in healthcare. *Adapted from Volovici et al., 2022.*
7. There are high expectations for artificial intelligence, but due to the wide variety of research questions, statistical methods will continue to be essential for progress in a world of data. *Adapted from Reid, 2018.*
8. The persistence of poor statistical methods results partly from rewarding discoveries, even when false, leading to the natural selection of bad science. *Adapted from Smaldino & McElreath, 2016.*
9. Academia will only thrive if we focus less on competition and prestige and more on collaboration and well-being.
10. Presenting complex work in simple ways facilitates understanding and scientific discussion.
11. Creating a tolerant academic society requires being intolerant of intolerance. *Adapted from Popper.*
12. Dancing is a vastly underrated networking skill.