Speaker:Matthew Buican
Abstract: The Coulomb Branch Operator Algebra (CBOA) generalises and unifies two fundamental sectors of 4d N=2 superconformal field theories (SCFTs): the Coulomb branch (anti)chiral ring and the part of the Schur sector generated by the 4d stress tensor multiplet. I will discuss some implications the structure of the CBOA has on the taxonomy of vertex operator algebras (VOAs) arising in the well-known 2d VOA / 4d N=2 SCFT correspondence discovered by some of the organizers of this workshop and their collaborators.

Speaker: Jethro van Ekeren
Abstract: In this talk I will present some results on the structure and representation theory of exceptional W-algebras (by which I mean rational vertex algebras obtained by Hamiltonian reduction of admissible level affine vertex algebras), focussing particularly on exceptional type. I will discuss computation of S-matrices and fusion rules, and proofs of isomorphism between rational W-algebras using analysis of asymptotics, character formulas, and associativity constraints. Based on joint works with T. Arakawa, A. Moreau and S. Nakatsuka.

Speaker: Justin Kulp
Abstract: In recent years, there has been a flurry of interest in various homotopy-informed ("higher") algebraic structures in quantum field theory. This includes secondary products and λ-brackets, as well as their n-entry generalizations.

In my talk, I will review how the BV-BRST formalism encodes these higher operations in the form of BRST anomalies. Just as scale anomalies lead to a non-trivial beta-function, the associated "BRST-flow" here defines a (generalized) L_∞ algebra structure on the space of interactions. Structure constants of this L_∞ algebra control (perturbative) deformations of the QFT, including information about anomalies and OPE coefficients. As an example, I will explicitly discuss the applications to the 2d βγ-system.

Time permitting, I will prove a non-renormalization theorem for holomorphic-topological QFTs with more than one topological direction, which can be thought of as a generalization of a formality theorem of Kontsevich. Based on arXiv:2403.13049 and arXiv:2207.14321.

Speaker: Wenbin Yan
Abstract: I will explain a correspondence between the representation theory of the VOA corresponding to a given 4d N=2 SCFT and the geometry of the Coulomb branch of the same 4d theory. For generalized Argyres-Douglas theories, one can read of simple modules and Higgs branch/associated variety from the Coulomb branch. I will also explain how this correspondence generalizes to regular class-S theories defined on a genus g Riemann surface with n-punctures.