# VDOSME 2012 Workshop

(Vaccine and Drug Ontology in the Study of Mechanism and Effect)

**Chairs:**

- **Yongqun “Oliver” He**, University of Michigan, Ann Arbor, MI, USA
- **Luca Toldo**, Merck KGaA, Darmstadt, Germany
- **Gully Burns**, Information Sciences Institute, Marina del Rey, CA, USA
- **Cui Tao**, Mayo Clinic, Rochester, MN, USA
- **Darrell R. Abernethy**, U.S. FDA, Bethesda, MD, USA

**PC Members:**

- **Olivier Bodenreider**, National Library of Medicine
- **Richard Boyce**, University of Pittsburgh
- **Lindsay Cowell**, University of TX Southwestern Medical Center
- **Dingcheng Li**, Mayo Clinic
- **Asiyah Yu Lin**, University of Michigan
- **Bjoen Peters**, La Jolla Institute for Allergy and Immunology
- **Sira Sarntivijai**, University of Michigan/US FDA
- **Nigam Shah**, Stanford University
- **Sungwan Sohn**, Mayo Clinic
- **Larisa Soldatova**, Aberystwyth University
- **Stephen Wu**, Mayo Clinic
- **Yuji Zhang**, Mayo Clinic
- **Jim Zheng**, Medical University of South Carolina
- **Qian Zhu**, Mayo Clinic

9:10 - 9:50 am
Session 1: Ontology modeling and analysis
Chair: Gully Burns
- Yu Lin and Yongqun He. Ontology representation and analysis of vaccine formulation and administration and their effects on vaccine immune responses (25 min)
- Drashti Dave and Gully Burns. A lightweight Ontology Design Pattern to curate and represent experimental variables from vaccine protection studies (15 min)

9:50 - 10:40 am
Session 2: Ontology-based knowledge extraction from big data case reports or literature
Chair: Luca Toldo
- Harsha Gurulingappa, Abdul-Mateen Rajput, Luca Toldo. Extraction of Adverse Drug Effects from Medical Case Reports (25 min)
- Junguk Hur, Arzucan Özgür, Zuoshuang Xiang and Yongqun He. Identification of fever and vaccine-associated gene interaction networks using ontology-based literature mining (25 min)

11:10 am - 12:00 noon
Session 3: Ontology-based semantic web applications
Chair: Oliver He
- Qian Zhu, Guoqian Jiang and Christopher Chute. Profiling structured product labeling using NDF-RT and RxNorm (25 min)
- Charalampos Doulaverakis, George Nikolaidis, Athanasios Kleontas and Yiannis Kompatsiaris. GalenOWL: Ontology based drug recommendations discovery (25 min)

1:30 - 2:05 pm
Session 4: General Discussion #1
Moderator: Luca Toldo
Topic: Relation between drug and vaccine ontology informatics (35 min)
- Similarities and differences between drug and vaccine informatics
- Collaborations between drug and vaccine ontology informatics fields
- Collaborations between academia and industry

2:05 - 2:30 pm
Session 5: Teleconference Presentation by a presenter from USA
Chair: Oliver He
- Cui Tao, Yongqun He, Gregory Poland and Christopher Chute. Time modeling of vaccine adverse events in VAERS for temporal analysis (25 min)

2:30 - 3:30 pm
Session 6: General Discussion #2
Moderators: Melanie Courtot and Oliver He
Topic: Updates on development of adverse event-related ontologies (60 min)
- Melanie: Updates on the development of the Adverse Event Reporting Ontology (AERO) and related ontologies (short talk: 10-15 min)
- Oliver: Updates on the development of the Ontology of Adverse Events (OAE) and its applications (short talk: 10-15 min)
- Further discussion

4:00 - 4:45 pm
Session 7: General Discussion #3
Moderator: Gully Burns
Topic: Challenges and opportunities (45 min)
- Current achievements and challenges
- International community collaborations
- Have another workshop next year?
- Other open issues for discussion

4:45 pm Workshop ends
Summary and Discussion

• **Ontology representation of vaccine and drug effects and mechanisms**
  - Positive effects and **negative effects (= adverse events)**
  - Different ways to represent adverse events (AERO, OAE, TEO for time events)

• **Many ontology applications in vaccine and drug areas**
  - Semantic web applications using vaccine and drug ontologies
    - e.g., RxNorm/NDF-RT for drug labeling and integration, drug recommendation
  - Enhanced text mining based on ontologies including VO and OAE
  - Use of both SWRL and DROOLS for building reasoning engines
  - Ontology Design Patterns and tools to assist OBI capture of experimental design

• **Challenges and Future Plan:**
  - Vaccines and Adverse Events provide an important active research area
  - Need to develop killer use cases
  - Especially relevant to ‘pharmacovigilance’ community (Luca)
  - Need to arrange follow-up meetings, esp. to incorporate domain experts (domain scientists / governmental agencies, industry players)
    - Focus on specific collaborative projects and follow-up meeting next year.