

Hybrid learning for early stage investigators in academic medicine: **The Applied Statistics in Biological Systems (ASIBS) Short Course**

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NO CONFLICTS OF INTEREST TO DISCLOSE

Overview

- ▶ Overarching Problem
- ▶ Hybrid Learning 'Large-scale' Solution in ASIBS
- ▶ Challenge of Engagement
- ▶ Quality Improvement

Overarching Problem

- ▶ Junior clinical researchers are managing complex clinical databases & registries, but statistical inadequacies pose major problems for:
 - Developing **testable research hypotheses** & choosing appropriate analytic methods
 - **Dissemination** & interpretation **of clinical findings**
 - **Successfully obtaining funding** for methodologically rigorous and reproducible research
 - **Academic promotion**
- ▶ Unique challenges confronted by underrepresented minorities (URMs)
 - More **difficulty acquiring appointments** in academic medical institutions
 - **Lack prior research engagement** in graduate training
 - **Racial/ethnic gap in academic promotion**
 - Cyclical problem (i.e., diverse mentors/leaders, recruitment, etc.)

Hybrid Learning 'Large-scale' Solution in ASIBS

- ▶ Prior 'small-scale' success in developing and implementing statistical 'boot camps' for clinical investigators (>120 in 4 years) at Mount Sinai leads us to ASIBS as a 'large-scale' hybrid learning solution
- ▶ Five-year NIGMS-funded (R25) Short Course to increase statistical capacity & SAS programming proficiency of junior faculty & postdoctoral fellows from academic medical institutions nationwide
 - Competitive online application (i.e., CV, personal statement, LOR, active involvement in research)
 - Diversity Recruitment Advisory Board & lodging fellowships to actively ensure that ≥40% of ASIBS participants are URM
- ▶ Hybrid learning format includes:
 - Seven weeks of online lectures in statistical theory from introductory probability & statistical inference thru logistic regression (January thru February)
 - One week of in-person SAS computing lectures & real-world data analysis at Mount Sinai (early March)

Hybrid Learning ‘Large-scale’ Solution in ASIBS

- ▶ Detailed description of ASIBS & curriculum at www.asibs-statistics.com
- ▶ Components of 7-week online component of ASIBS
 - Weekly **asynchronous statistical theory lectures** (paced individual learning)
 - Weekly **synchronous office hours** (morning and evening)
 - **Weekly homework** to reinforce difficult statistical concepts
- ▶ Comprehensive 1-week, in-person SAS computing component of ASIBS
 - Daily **statistical theory reviews** (1-1.5 hours)
 - Daily **statistical computing lectures** (2-2.5 hours)
 - Daily **office hours** (1 hour)
 - Daily real-world, hands-on **statistical computing labs** (2.5-3 hours)

Challenge of Engagement

- ▶ Eight week hybrid format creates unique challenges to ensuring participant retention/engagement
- ▶ Accepting offer to participate does not exclude in-person week
- ▶ SAS computing lectures rely on underlying foundation gained from statistical theory lectures
 - Cannot **assess model diagnostics** without thoroughly understanding underlying **model assumptions**
 - Cannot conduct a **Likelihood Ratio Test** without some general knowledge about a **likelihood function**
- ▶ #ResearchMatters – ASIBS cannot exist in a vacuum for participants

Quality Improvement – Lessons Learned from Year 1 Cohort for Year 2 Cohort

- ▶ Accepting offer to participate does not exclude in-person week
 - Commit to in-person week when accepted offer
 - Increased engagement of mentors/supervisors through modified LOR
- ▶ SAS computing lectures rely on underlying foundation gained from statistical theory lectures
 - Strongly encouraged participants to review lectures
 - Reduced online lectures from 1.5-2 hours to multiple segments ≤ 0.5 hour
 - Tracked online lecture progress (GoToMeeting) and communicated directly with participants when falling too far behind
 - Increased flexibility of virtual office hours
 - In depth constructive feedback for submitted homeworks via Blackboard

Quality Improvement – Lessons Learned from Year 1 Cohort for Year 2 Cohort

- ▶ #ResearchMatters – ASIBS cannot exist in a vacuum for participants
 - Provided individualized statistical consultations during office hours
 - Individualized SAS computing labs so participants could analyze their own data
 - Included a Center for Biostatistics Grand Rounds lecture for in-person week to demonstrate real-world statistical applications to complex clinical challenges
 - Provided a platform for participants to present their findings

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