Addressing Unprecedented Community-Centered Transportation Infrastructure Needs and Policies for the Mobility Revolution

1952241
Michael Hyland, University of California Irvine
PG, FY2020

Principal Research Investigators (Name, Institution)

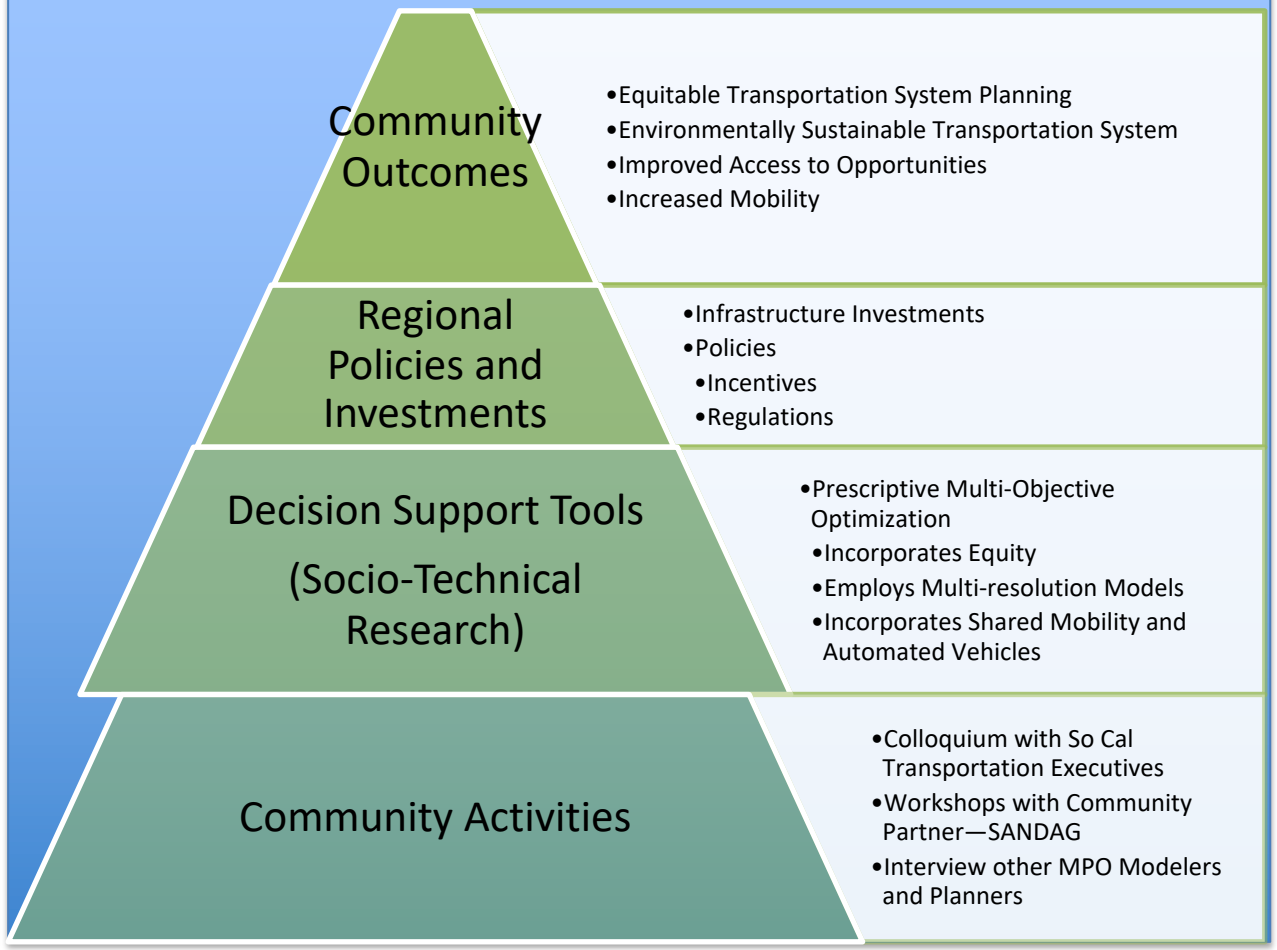
- *Prof. Michael Hyland, University of California Irvine*
- *Prof. Michael McNally, University of California Irvine*
- *Prof. R. Jayakrishnan, University of California Irvine*
- *Prof. Stephen Ritchie, University of California Irvine*
- *Prof. Wenlong Jin, University of California Irvine*
- *Dr. Craig Rindt, University of California Irvine*

Community Partners (Name, Institution)

- *Ray Traynor, San Diego Association of Governments*
- *Pat Landrum, San Diego Association of Governments*

Project Overview

Visual Schematic



Project Vision

Vision*:* Completely revamp regional transportation system modeling framework

- Support regional transportation planning decisions
- Planning decisions have a major impact on quality of life in metropolitan regions
  - Quality of life metrics: mobility, access to opportunities, equity, and emissions

Project Overview

Use-Inspired Research

Societal Problem in Community

- Congested, Inequitable, Polluting Regional Transportation System
  - In *San Diego, California Metropolitan Area*
    - Our Target Community

Socio-Technical Problem of Community Partner

- Community Partner – *the San Diego Association of Governments (SANDAG)* – lacks the modeling tools to:
  - Optimize Regional Transportation Planning Decisions
  - Capture mobility-on-demand services
  - Analyze equity implications of regional plans

PG Activities

Weekly Research Meetings
- Refine Project Scope
- Refine Research Approach
- Identify Additional Collaborators

Colloquium with Southern California Transportation Executives
- Identify:
  - Community Needs
  - Regional Planning Vision and Plans
  - Regional Goals and Objectives

Workshops with Community Partner--SANDAG
- Understand Political Challenges
- Discuss Potential Policy Levers
- Discuss Socio-Technical Approach
- Discuss Modeling Improvements

Interview other MPO Modelers and Planners
- Compare and Contrast Goals, Policies, Models with San Diego
- Support Transferability of San Diego Research

Draft and Submit NSF S&CC IRG Proposal

(in Feb. 2021)

Draft and Publish White Paper
- Publish key ideas from proposal
- Extend key ideas from proposal given more space
- Receive feedback from social science researchers, engineering researchers, and practitioners – regional modelers and planners

Proto-type Components of Modeling Framework
- Community partner wants three things in short term
  - Improved models for equity analysis
  - Models for mobility-on-demand services
  - Assessment of existing data sources and missing data

Project Update

Weekly Research Meetings
- Refine Project Scope
- Refine Research Approach
- Identify Additional Collaborators

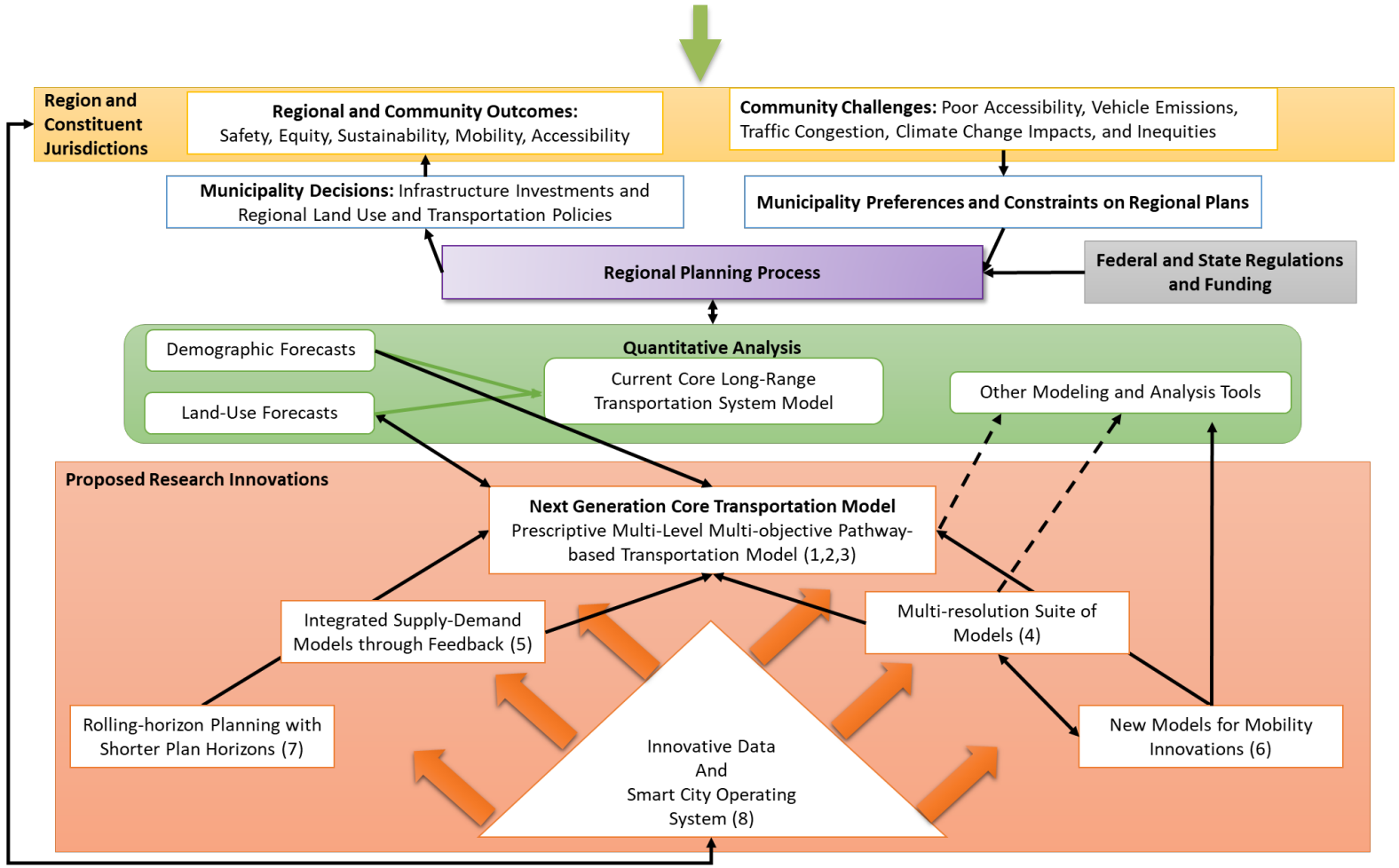
Colloquium with So Cal Transportation Executives
- Identify:
  - Community Needs
  - Regional Planning Vision and Plans
  - Regional Goals and Objectives

Workshops with Community Partner--SANDAG
- Understand Political Challenges
- Discuss Potential Policy Levers
- Discuss Technical Approach

Interview other MPO Modelers and Planners
- Compare and Contrast Goals, Policies, Models with San Diego
- Support Transferability of San Diego Research

Draft and Submit NSF S&CC IRG Proposal

(in Feb. 2021)



Project Evolution

From Colloquium:

- *transportation planning agencies do not view, analyze, or plan for mobility-on-demand (MOD) services and connected automated vehicles (CAVs) in a silo.*
- *MOD services and CAVs are viewed alongside other travel modes and technologies, as possible tools to improve mobility, environmental sustainability, and equity.*
- *Hence,*
  - *Research team has broadened the scope of the research project to focus on regional transportation system modeling and planning as a whole*
  - *Not just MOD services and CAVs*

From Workshop with SANDAG modeling team

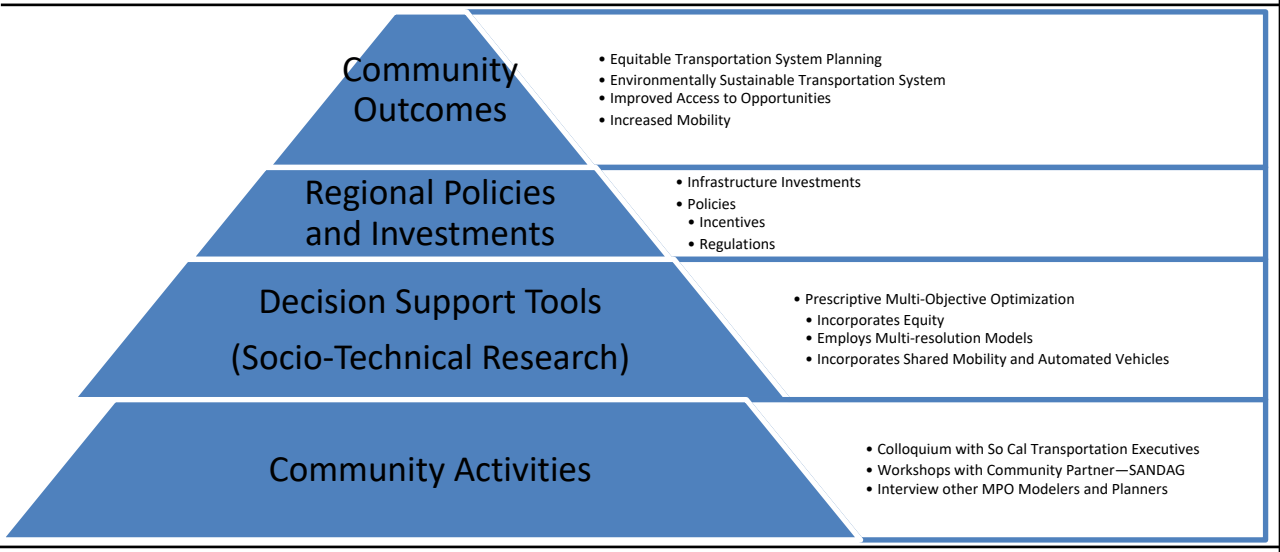
- *Modeling team has three priority areas:*
  - *Improving analysis tools to assess the equity implications of regional plans*
  - *Developing scalable and effective models of MOD services,*
  - *Evaluating existing open-source and proprietary (big) data sources and identifying additional data needs for regional planning*

Addressing Unprecedented Community-Centered Transportation Infrastructure Needs and Policies for the Mobility Revolution

1952241

Michael Hyland, University of California Irvine

PG, FY2020



- **Vision***:* Completely revamp regional transportation system modeling framework
  - Support regional transportation planning decisions
  - Planning decisions have a major impact on quality of life in metropolitan regions
    - Quality of life metrics: mobility, access to opportunities, equity, and emissions
- **Fundamental Research Advancement**
  - Replace existing *predictive* regional transport models
  - With *prescriptive* multi-objective, -level, and -resolution models that incorporate equity, shared mobility, and path dependence explicitly
- **Applied Research and Piloting Activities:** Community Partner will
  - Employ time-critical model components in the short term
  - Pilot revamped modeling framework in medium term
  - Adopt revamped modeling framework in the long term

Societal Problem in Community

- Congested, Inequitable, Polluting Regional Transportation System
- In *San Diego, California Metropolitan Area*
- Our Target Community

Socio-Technical Problem of Community Partner

- Community Partner – *the San Diego Association of Governments (SANDAG)* – lacks the modeling tools to:
- Optimize Regional Transportation Planning Decisions
- Capture mobility-on-demand services
- Analyze equity implications of regional plans

Weekly Research Meetings
- Refine Project Scope
- Refine Research Approach
- Identify Additional Collaborators

Colloquium with Southern California Transportation Executives
- Identify:
  - Community Needs
  - Regional Planning Vision and Plans
  - Regional Goals and Objectives

Workshops with Community Partner-- SANDAG
- Understand Political Challenges
- Discuss Potential Policy Levers
- Discuss Socio-Technical Approach
- Discuss Modeling Improvements

Interview other MPO Modelers and Planners
- Compare and Contrast Goals, Policies, Models with San Diego
- Support Transferability of San Diego Research

Draft and Submit NSF S&CC IRG Proposal

(in Feb. 2021)

Draft and Publish White Paper
- Publish key ideas from proposal
- Extend key ideas from proposal given more space
- Receive feedback from social science researchers, engineering researchers, and practitioners – regional modelers and planners

Proto-type Components of Modeling Framework
- Community partner wants three things in short term
  - Improved models for equity analysis
  - Models for mobility-on-demand services
  - Assessment of existing data sources and missing data

Please organize the contents of slides (2) and (3) as a quad-chart using the template below. The quad chart should not be included in your lightning talks but should be submitted to NSF S&CC through an upload link that will provided in the coming weeks.