

# THE SECOND ANNUAL WORKSHOP

June 27-29, 2018.



## Speakers

**Martin Biel**, KTH • **Oscar Dowson**, U. of Auckland • **Joaquim Dias Garcia**, PSR & PUC-Rio • **Hassan Hijazi**, LANL • **Jean-Hubert Hours**, Artelys • **Oliver Huber**, UW-Madison • **Joey Huchette**, MIT • **Ole Kroger**, Uni Heidelberg • **Benoît Legat**, UCLouvain • **Miles Lubin**, Google • **Guillaume Marques**, U. de Bordeaux • **Harsha Nagarajan**, LANL • **François Pacaud**, CERMICS, ENPC • **Abel Soares Siqueira**, Federal University of Paraná • **Julie Sliwak**, RTE • **Mohamed Tarek**, UNSW Canberra • **Matthew Wilhelm**, U. of Connecticut • **Ulf Worsøe**, Mosek

Sponsored by:



[www.juliaopt.org/meetings/bordeaux2018](http://www.juliaopt.org/meetings/bordeaux2018)

# Welcome and Thanks!

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- Organizing committee:



Miles Lubin



Oscar Dowson



Benoît Legat



Joaquim Garcia

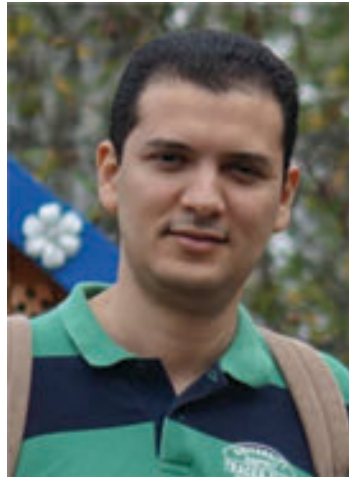
# Welcome and Thanks!

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- Local organizing committee:



François Vanderbeck



Issam Tahiri

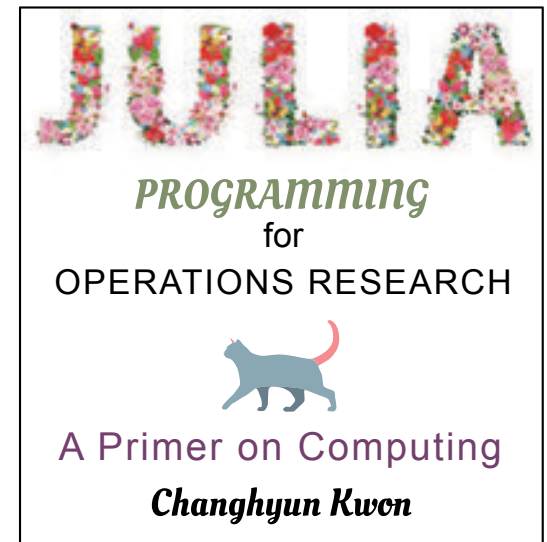


Magali Garcia

# Welcome and Thanks!

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- Sponsors:



# Welcome and Thanks!

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- Additional travel support:
  - Annie Burrell
  - Marty Checchi



MIT International Science  
and Technology Initiatives



**UAI**  
UNIVERSIDAD ADOLFO IBÁÑEZ



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- Speakers:
  - Joey Huchette (MIT)
  - Guillaume Marques (Université de Bordeaux)
  - Jean-hubert Hours (Artelys)
  - Ulf Worsøe (MOSEK)
  - Joaquim Dias Garcia & Mario Souto (PUC-Rio)
  - Martin Biel (KTH - The Royal Institute of Technology)
  - François Pacaud (CERMICS, ENPC)
  - Julie Sliwak (RTE)

# Welcome and Thanks!

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  - Abel Soares Siqueira (Federal University of Paraná)
  - Hassan Hijazi (LANL)
  - Harsha Nagarajan (LANL)
  - Miles Lubin (Google)
  - Ole Kröger (Uni Heidelberg)
  - Oscar Dowson (University of Auckland)
  - Benoît Legat (UCLouvain)
  - Matthew Wilhelm (University of Connecticut)
  - Olivier Huber (UW Madison)



# Welcome and Thanks!

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- Audience and Julia/JuMP community:



Julia and JuMP Tutorial at Universidad Adolfo Ibáñez, Santiago, Chile. January, 2014.



JuMP Developers Workshop. MIT Sloan, Cambridge, MA. June, 2017.



# 21st Century Programming/Modelling Languages

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- Open-source and free!
- Developed at MIT
- “Floats like python/matlab, stings like C/Fortran”
- Easy to use and wide library ecosystem (specialized and frontend)
- Only language besides C/C++/Fortran to scale to 1 Petaflop!



- Open-source and free!
- Optimization modelling language and interface
- Easy to use and advanced
- Integrated into Julia
- Created at MIT and beyond...

# Easy to learn – Easy to Use

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Nestor Sepulveda



Ingeniería Naval  
Eléctrica

**Learned** Optimization using JuMP

## Nimble Programming:

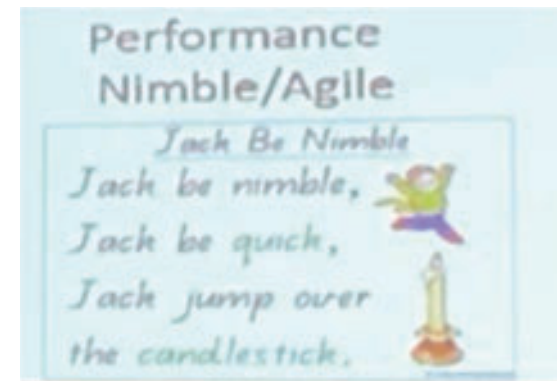


Chris Coey



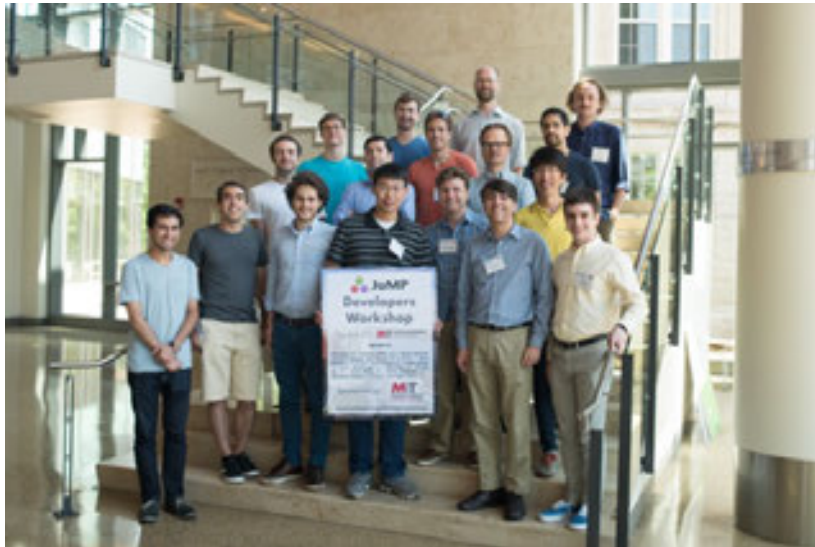
OPERATIONS  
RESEARCH  
CENTER

Optimization Solver: Re-coded from  
scratch multiple times



“... we had to move to reading GAMS files directly. And that led to **making a modeling language**, because it kills two birds with one stone.”

# Large Software Stack and Vibrant Community



# News and State-of-the-JuMP

Congratulations Dr. Huchette and Dr. Lubin (again)!

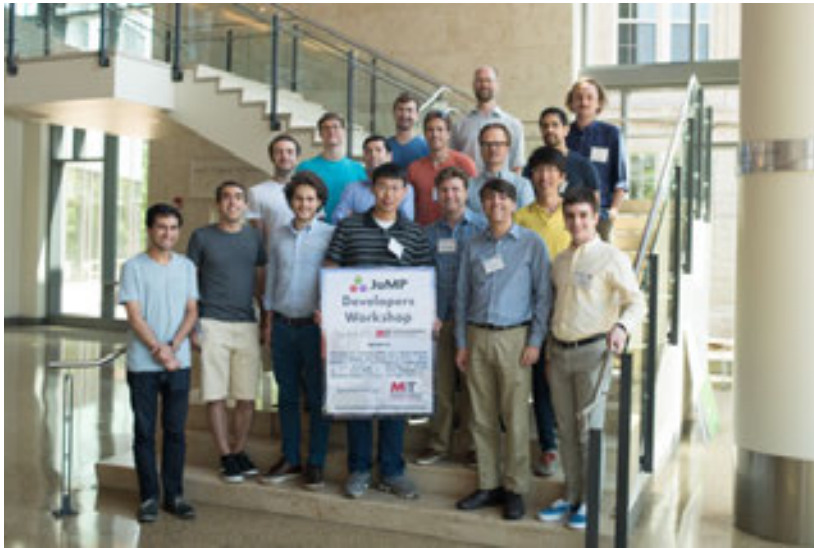
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# First Annual JuMP-dev Workshop: June 2017

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A poster for the JuMP Developers Workshop. At the top, the JuMP logo (three colored circles) is next to the text "JuMP Developers Workshop". Below this, it says "June 12-16, 2017." followed by the "MIT MANAGEMENT SLOAN SCHOOL" logo. The "Speakers" section lists: Chris Coey, MIT • Carleton Coffrin, LANL • Steven Diamond, Stanford • Joaquim Dias Garcia, PSR & PUC-Rio • Oscar Dowson, U. of Auckland • Joey Huchette, MIT • Jordan Jalving, UW-Madison • Benoît Legat, UCL • Miles Lubin, MIT • Yee Sian Ng, MIT • Jarrett Revels, MIT • Nestor Sepulveda, MIT • Bartolomeo Stellato, U. of Oxford • Junc Pablo Vielma, MIT. The "Sponsored by:" section features the "MIT MANAGEMENT LATIN AMERICA OFFICE" logo. At the bottom, the website "www.juliaopt.org/developersmeetup" is listed.

**JuMP  
Developers  
Workshop**

June 12-16, 2017. **MIT** MANAGEMENT  
SLOAN SCHOOL

**Speakers**

**Chris Coey, MIT • Carleton Coffrin, LANL • Steven Diamond, Stanford • Joaquim Dias Garcia, PSR & PUC-Rio • Oscar Dowson, U. of Auckland • Joey Huchette, MIT • Jordan Jalving, UW-Madison • Benoît Legat, UCL • Miles Lubin, MIT • Yee Sian Ng, MIT • Jarrett Revels, MIT • Nestor Sepulveda, MIT • Bartolomeo Stellato, U. of Oxford • Junc Pablo Vielma, MIT**

Sponsored by: **MIT**  
MANAGEMENT  
LATIN AMERICA OFFICE

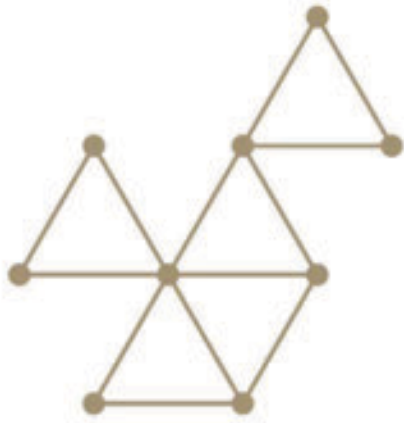
[www.juliaopt.org/developersmeetup](http://www.juliaopt.org/developersmeetup)



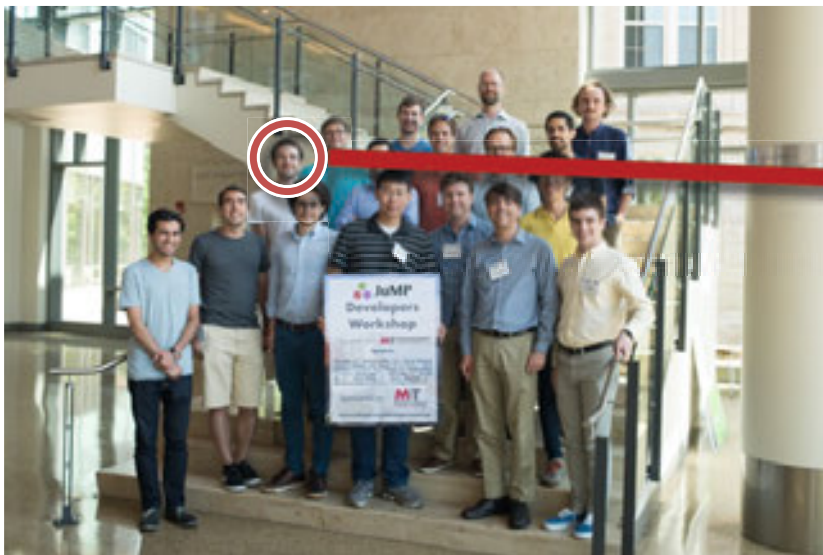
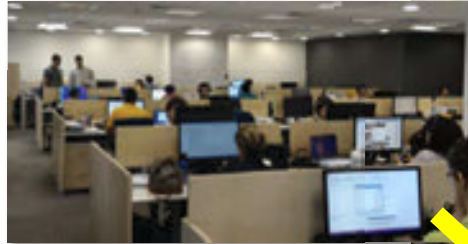
Some JuMP-Dev 2017 talks...

# Technological Solutions for Electrical Markets

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PSR



**Joaquim Dias Garcia**

# PSR Projects Where Julia / JuMP is Crucial

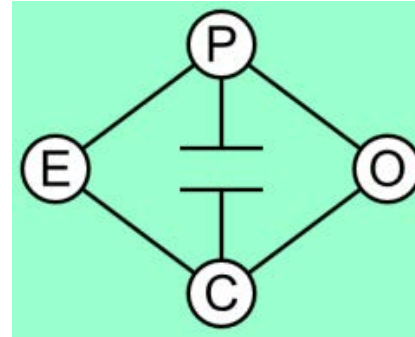
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- Power Systems Expansion for Peruvian Energy Ministry
- Portfolio Optimization and Hydro Basin Optimization in Magdalena Basin in Colombia
- Evaluating Latin American Interconnections
- Large scale reliability evaluation Columbia River Basin

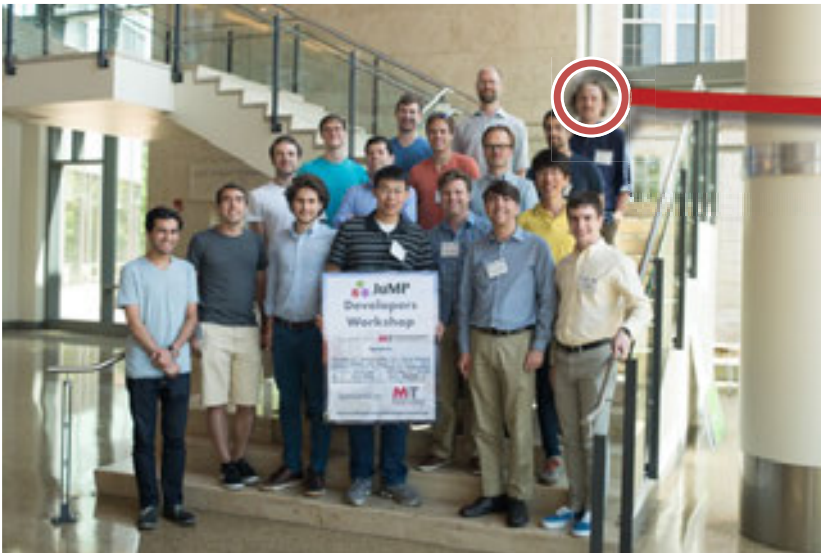


<http://www.juliaopt.org/developersmeetup/>

# Milk Output Optimizer, or MOO



- From hydroelectric power to dairy farms:
  - rain, price of (milk/electricity) and substitutes (coal/corn)



**Oscar Dowson**



# Advanced Network Science Initiative

- 34 repositories  
(<https://github.com/lanl-ansi>)
  - PowerModels.jl
  - GraphicalModelLearning.jl
  - Juniper.jl (MINLP solver)
  - GasGridModels.jl
  - ...

## A Bit About LANL

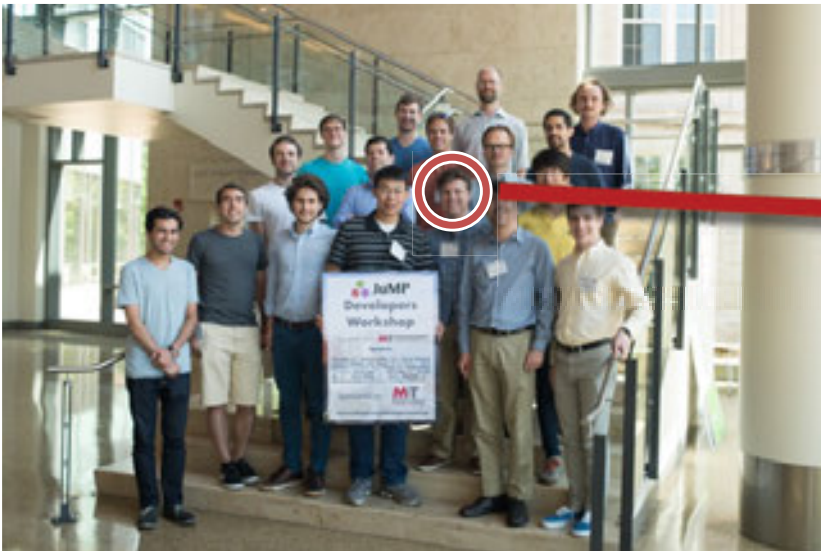
ANSI  
**LOVES**  
JuliaOpt



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Operated by Los Alamos National Security, LLC for the U.S. Department of Energy's NNSA

LA-UR-17-24522



**Carleton Coffrin**

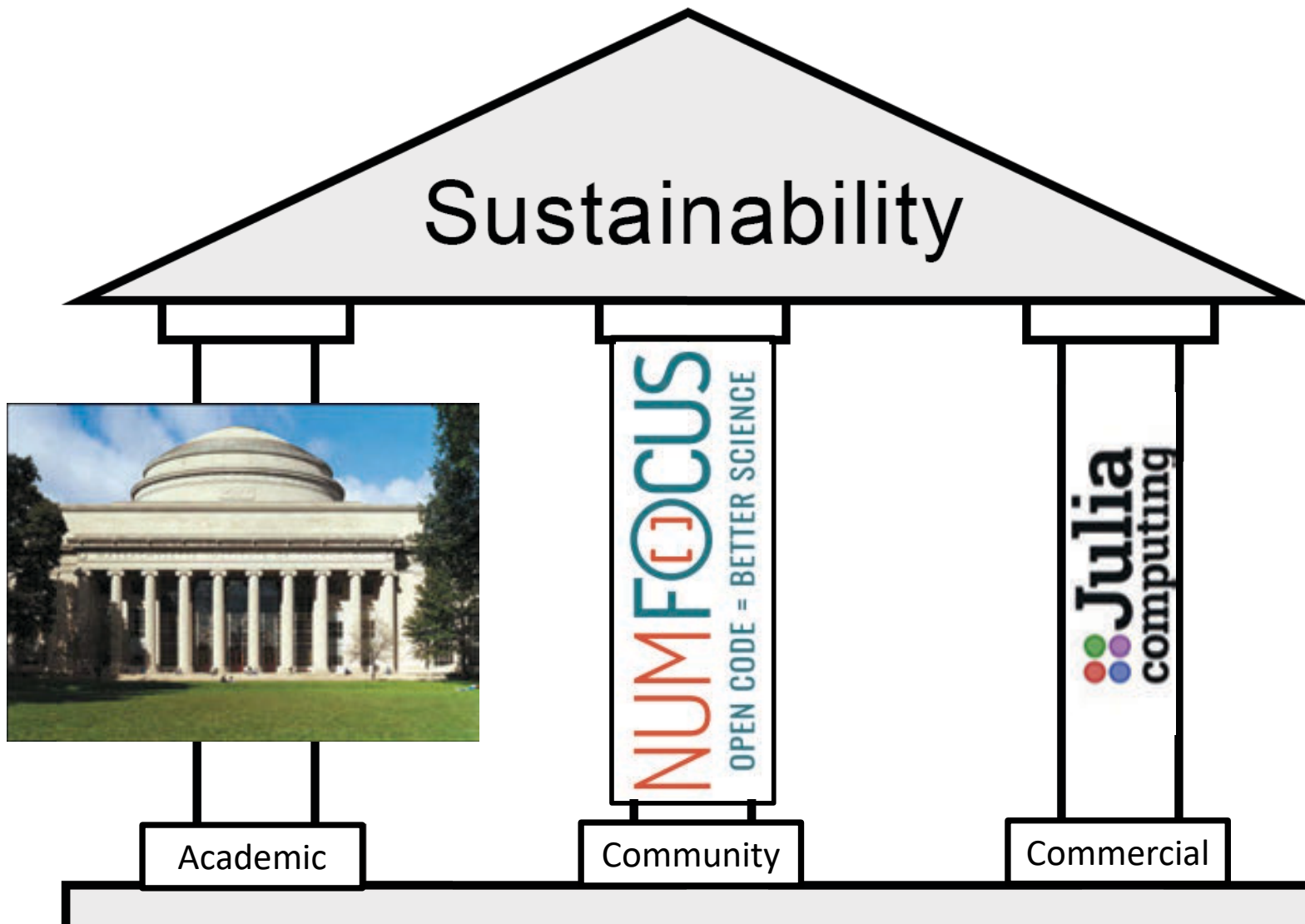
# JuMP in Chile (August 2018)





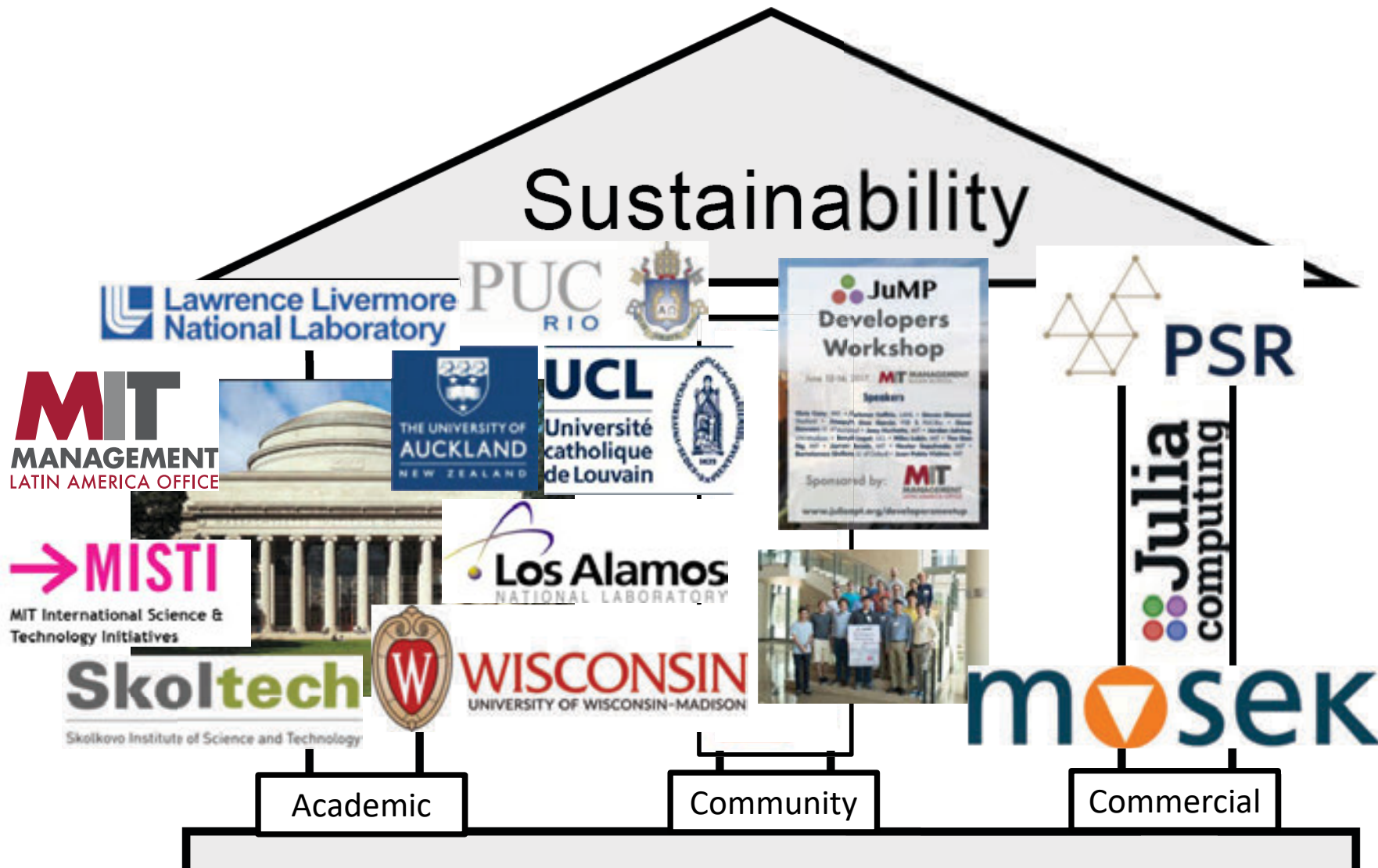
# Sustainability Plan for Julia and JuMP

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Remain (Primarily) Open-Source

# Sustainability Plan for Julia and JuMP

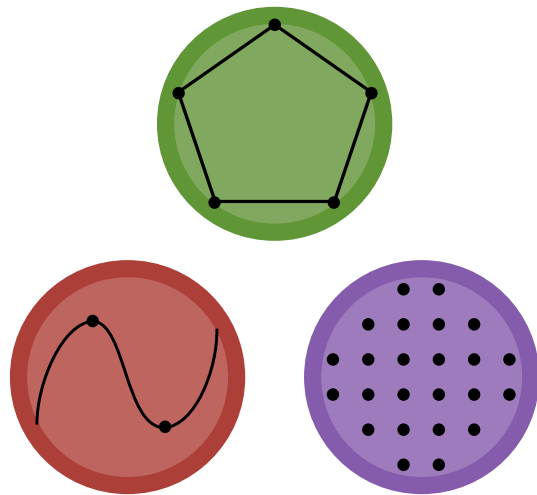


Remain (Primarily) Open-Source

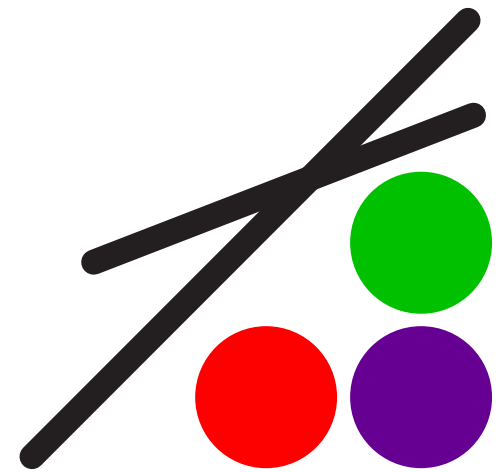
JuMP will be a NumFOCUS Sponsored Project!

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NUMFOCUS  
OPEN CODE = BETTER SCIENCE



**JuliaOpt**



**JUMP**

# What's next? JuMP 1.0?

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- Julia 1.0? (Julia 0.7.0-beta since Monday)
- MathOptInterface and JuMP 0.19
  - Miles Thursday afternoon
- By **juliacon** 2018 ?
  - 7th to 11th August, 2018 at University College London



**Juan Pablo Vielma**

MIT Sloan

## Workshop

### The JuMP ecosystem for mathematical optimization

JuMP is an award-winning DSL for mathematical optimization that has quickly become the gold-standard for its simplicity, performance, and versatility. A major overhaul of JuMP will be finalized during the JuMP-dev workshop in June, so it is the perfect time for an updated tutorial and feature demo.