

Introduction to **COIN-OR**: *open-source for the OR Community*

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Program Manager, COIN-OR, IBM Research

Board Member, COIN-OR Foundation



[Introduction to COIN-OR]

- n Why
- n What
- n How



[Why?

n ???



[Reasons “Why”]

- n Reuse rather than reinvent



[Reasons “Why”]

- n Reuse rather than reinvent
- n Fairer comparisons



[Reasons “Why”]

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- n Fairer comparisons
- n Build on the best



[Reasons “Why”]

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n Reference

- i R. Lougee-Heimer, “The common optimization interface for operations research: promoting open source software in the operations research community”, *IBM Journal of Research and Development*, 47 (2003) 57-66,
<http://www.research.ibm.com/journal/rd/471/lougee.html>.



[Vision

*COIN-OR is to mathematical “software”
as the
open literature is to mathematical theory*



[What? COIN-OR is...]

n **CO**mputational **IN**frastructure for **O**perations **R**esearch

- i Repository
- i Service
- i Community



[“What”? Repository]

- n A **repository** of source code, examples, models, and data
 - i Under open-source licenses
 - i Available at no cost
 - i For use and modification
 - i On multiple platforms

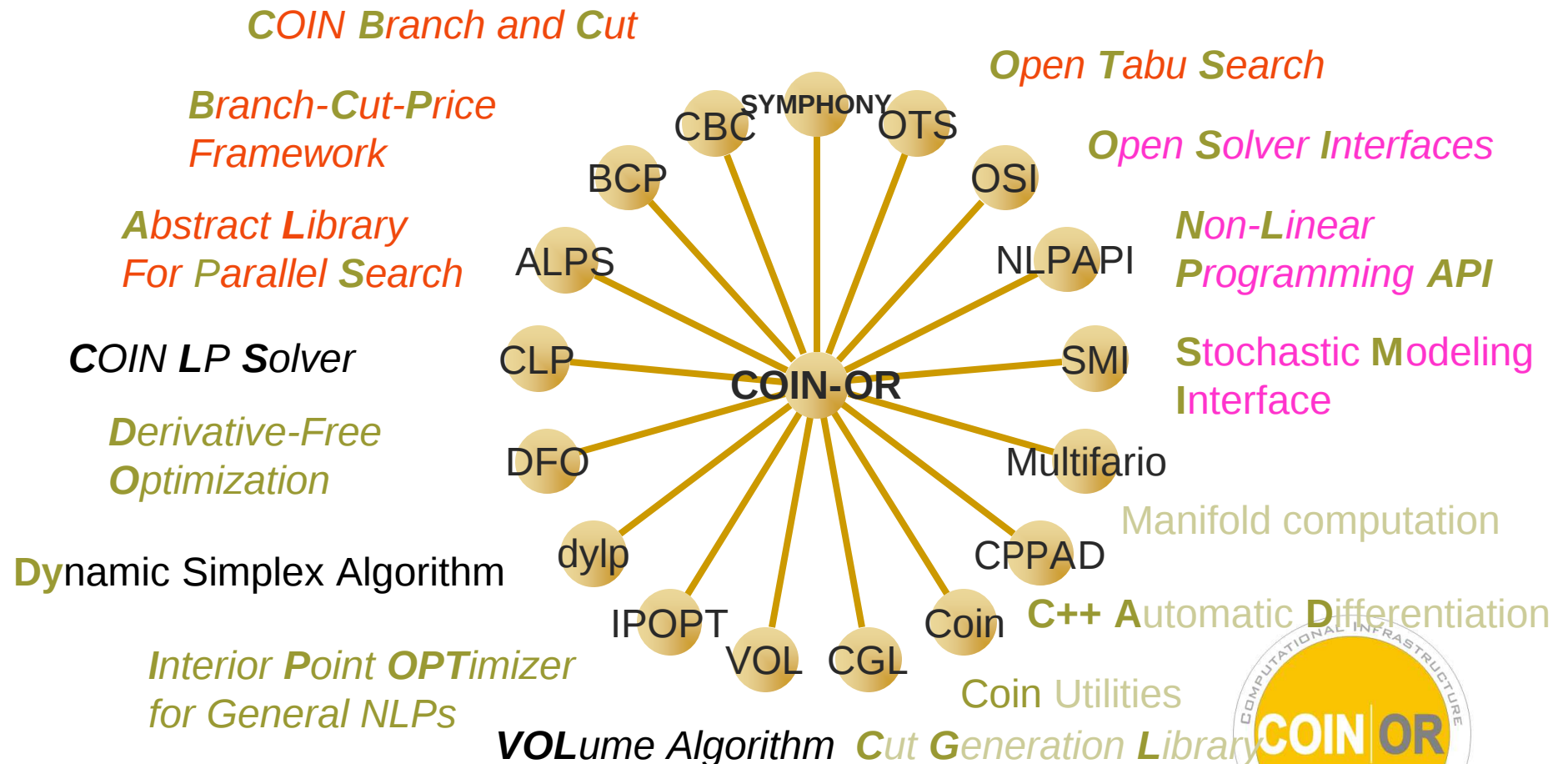


[Projects include tools for...]

- n Solvers
- n Frameworks
- n Interfaces
- n Modeling Languages
- n Utilities
- n < other tools welcome! >



COIN-OR Projects



[Projects Include...]

- n Linear Programming
- i Clp, Dylp, VOL



[Projects Include...]

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- n Integer Linear Programming
 - i ALPS, BCP, Cbc, COPS, SYMPOHONY



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- n Stochastic
 - i SMI
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- n Data Structures and Linear Algebra
 - i CoinUtils



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- n Data Structures and Linear Algebra
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- n Differentiation
 - i CppAD



[Project Management]

- n Project run by “Project Manager(s)”
 - i Benevolent Dictator
 - i Controls what is distributed
 - i Has write-access to repository
 - n The world has read access and modifies their **local** copy.



[“What”? Services]

- n A suite of **services** enabling distributed development and collaboration



[“What”? Services]

- n A suite of **services** enabling distributed development and collaboration
 - i Version control system
 - i Web pages
 - i “Wiki”
 - i Bug reporting system
 - i Mailing lists



[“What”? Community]

- n COIN-OR exists for and is run by the OR community



Milestones

- n 2000 - COIN is born
 - i Announced at ISMP in Atlanta as 3 year experiment
 - i Core-team: 6 IBM + 1 nonIBM
 - i Hosted by IBM
 - i Provocateur and first-user of Common Public License
 - i Name changed to COIN-OR Name
- n 2002
 - i INFORMS agrees to host COIN-OR
 - i Name changed to better reflect the mission
- n 2003
 - i Student programming contest with MPS and INFORMS
 - i Core-team: 9 IBM + 6 nonIBM representing five universities and one govt institution.
- n 2004
 - i Educational nonprofit COIN-OR Foundation, Inc established
 - i Hosted by INFORMS
- n 2005
 - i Banner
 - i First annual COIN-OR Cup Competition
- n 2006
 - i Logo contest (selected by members from 65 entries)
 - i DIMACS Workshop on COIN-OR (4 day, 50 participants)

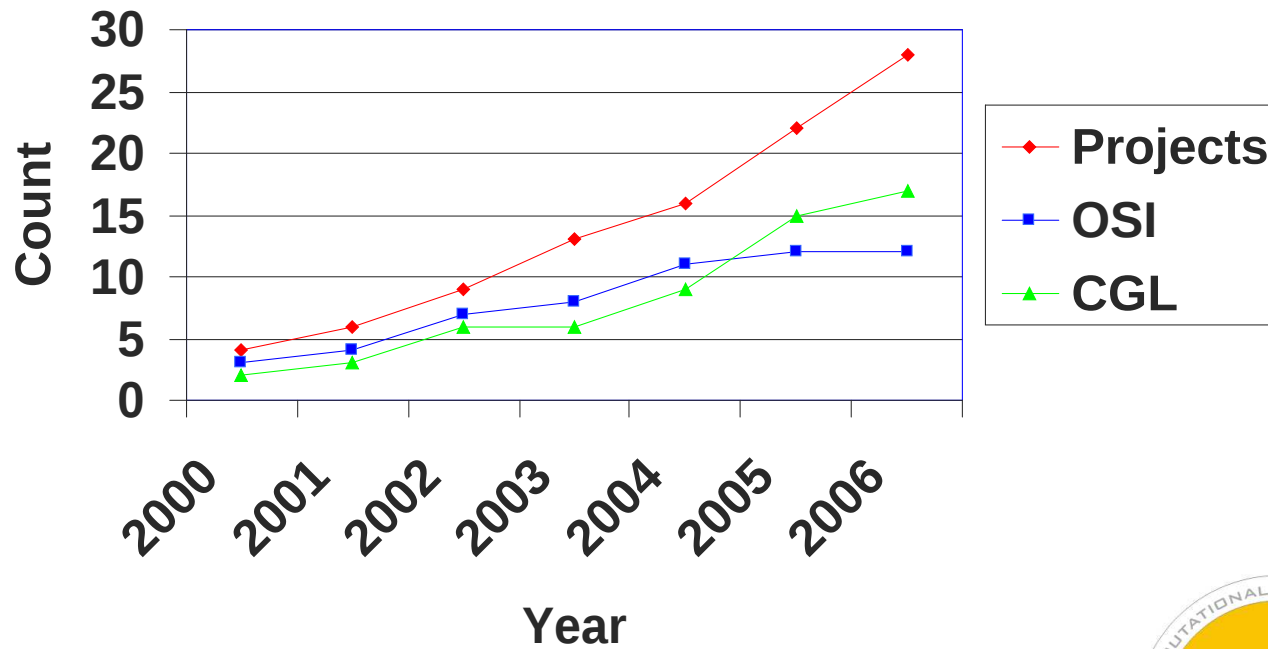


*Institute for Operations Research
and the Management Sciences*



[Growth]

COIN-OR Growth



[How? COIN-OR Foundation, Inc.]

- n Business and Technical Boards
 - i Elected
- n Full and Associate Individual Members
- n Corporate Members and Sponsors



[Foundation Leadership]

n Strategic Leadership Board

- i Bob Fourer, Northwestern
- i Lou Hafer, SFU
- i Brady Hunsaker, U of Pgh
- i Randy Kiefer, INFORMS
- i Kevin Furman, Exxon Mobil
- i Robin Lougee-Heimer, IBM
- i Matt Saltzman, Clemson
- i TLC Chair

n Technical Leadership Council

- i JP Fasano, IBM
- i Laszlo Ladanyi, IBM
- i Leo Lopes, U of Arizona
- i Francois Margot, CMU
- i Kipp Martin, U of Chicago
- i Ted Ralphs, Lehigh
- i Andreas Waetcher, IBM

- Attending the Puerto Rico meeting



Community



INFORMS Puerto Rico 2007

Robin Lougee-Heimer



“How”? Universities

- n Brunel
- n Carl von Ossietzky University, Olden
- n Carnegie Mellon
- n Clemson
- n Cornell
- n Konrad-Zuse-Zentrum für Informationstechnik Berlin
- n Lehigh
- n New Mexico Tech
- n Northwestern
- n Politecnico di Milano
- n Rutgers
- n Simon Fraser University
- n U de Geneve
- n U of Arizona
- n U of Chicago
- n U of Pittsburgh
- n U of São Paulo
- n U of Washington
- n U.S. Airforce Academy
- n U of Waterloo
- nmany others

ZIB

Brunel
UNIVERSITY
WEST LONDON

CLEMSON
UNIVERSITY

 Simon Fraser
University


CORNELL
UNIVERSITY



 **LEHIGH**
UNIVERSITY

USP

Universidade de São Paulo
B R A S I L



UNIVERSITÉ DE GENÈVE

 UNIVERSITY OF
WASHINGTON



UB University at Buffalo The State University of New York

The University of
ARIZONA
TUCSON ARIZONA

THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS



[“How”? Companies such as...]



Industry accounts for 37 % of the coin-discuss mail list (2005)



[Challenges]

- n Documentation
- n Ease of use
- n Testing
- n Intellectual Property
- n Recognition



[Getting Involved]

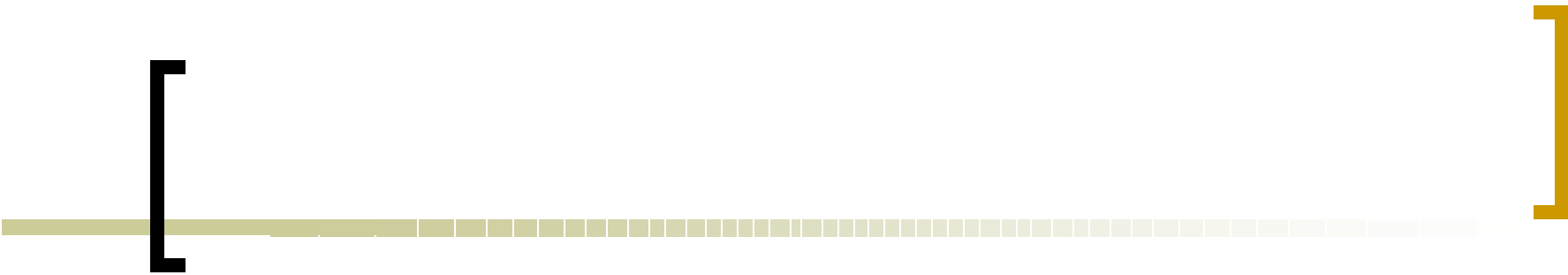
- n Use COIN-OR as a resource in research, teaching and practice
- n Give feedback via mailing lists and issue tracking systems
- n Become Associate Member (US\$10)
- n Join discussion lists and share your expertise
- n Tell your students & colleagues about COIN-OR
- n Write documentation!
- n Volunteer to do outreach: conference, articles, ...
- n Contribute patches and improve existing projects
- n Contribute a new project



[Using COIN-OR]

- n www.coin-or.org
 - i Tarballs and Subversion
- n NEOS 
 - i Bonmin, CLP, CBC, CSDP, DFO, IPOPT
- n Products
 - i Frontline Systems, Knitro, ...
- n Support
 - i Free on coin-discuss@list.coin-or.org





www.coin-or.org

COIN-OR User Meeting:
Tuesday, July 10, 5:00 – 6:00 pm
Rio Mar Salon 4

