

**VITAE**  
**JOHN W. LABADIE**

**CURRENT POSITION:**

Professor

Division Coordinator

Department of Civil Engineering  
Colorado State University  
Water Resources Planning and  
Management Division

**BUSINESS ADDRESS:**

Department of Civil Engineering  
Colorado State University  
Fort Collins, CO 80523-1372  
Phone: (970)491-6898 [FAX: (970)491-7727]  
Email: John.Labadie@colostate.edu

**DATE OF BIRTH:**

November 29, 1942

**EDUCATION:**

- Ph.D. in Industrial Engineering and Operations Research  
Major field: *Operations Research*  
Minor fields: *Water Resources Engineering*  
*Statistics* University of California, Berkeley 1972
- M.S. in Engineering  
Major field: *Water Resources Engineering*  
Minor field: *Systems Engineering* University of California, Los Angeles 1968
- B.S. in Engineering University of California, Los Angeles 1966

**PROFESSIONAL HISTORY:**

- Coordinator, 1991 to present  
Water Resources Planning and Management Division  
Department of Civil Engineering  
Colorado State University
- Professor 1982 to present  
Associate Professor 1977 to 1982  
Assistant Professor 1972 to 1977  
Department of Civil Engineering  
Colorado State University
- Visiting Professor 1991 to present  
Interuniversity Program in Water Resources Engineering (IUPWARE)  
Catholic University of Leuven *and*  
Free University of Brussels, Belgium
- Visiting Lecturer 1986 to 1990  
Center for Irrigation Engineering  
Catholic University of Leuven, Belgium
- Visiting Fulbright Scholar 1988 to 1989  
Directorate General for Natural Resources, Portugal
- Visiting Scientist 1981 to 1982  
Reservoir Control Center  
U.S. Army Corps of Engineers  
Cincinnati, Ohio

**PROFESSIONAL REGISTRATION:**

- Registered Professional Engineer State of Colorado, #13210

## MEMBERSHIPS AND AFFILIATIONS:

- Member, American Society of Civil Engineers (ASCE)
  - Current Editor, ASCE *Journal of Water Resources Planning and Management* (starting July 2000)
  - Associate Editor, ASCE *Journal of Water Resources Planning and Management* (1998-2000)
  - Organized 3<sup>rd</sup> Operations Management Workshop on *Computerized Decision Support Systems for Water Managers*, Colo. State Univ., Ft. Collins, Colorado--over 200 participants from 7 countries (July 1988)
  - Chairman, Operations Management Committee, Water Resources Planning and Management Division (1988)
  - Served on Publications Committee for Water Resources Planning and Management Division (1985-1988)
  - Edited special issue of *Journal of Water Resources Planning and Management* devoted to topic: Computerized Decision Support Systems for Water Managers (Vol. 112, No. 3, Jun. 1986)
- Member, Institute for Operations Research and the Management Sciences (INFORMS)
- Member of the Selection Committee for Fulbright Scholarships in Environmental Science, Council for International Exchange of Scholars, Washington D.C. (1993-1995)

## AWARDS AND HONORS:

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| <ul style="list-style-type: none"> <li>▪ Winner, Annual Paper Award Best Practice-Oriented Paper</li> <li>▪ Winner of Fulbright Research Scholarship</li> <li>▪ Outstanding Civil Engineering Faculty Member</li> <li>▪ Winner, Annual Paper Award</li> <li>▪ Listed in <i>Who's Who in Engineering</i></li> </ul> | <ul style="list-style-type: none"> <li><i>Journal of Water Resources Planning and Management</i>, American Society of Civil Engineers</li> <li>Directorate General for Natural Resources, Portugal</li> <li>in Competition for Halliburton Award, College of Engineering, Colorado State University</li> <li>American Society of Agricultural Engineers</li> <li>Ninth Edition</li> </ul> | <ul style="list-style-type: none"> <li>1998</li> <li>1988</li> <li>1982</li> <li>1978</li> </ul> |
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## RESEARCH PROJECTS [PRINCIPAL/CO-PRINCIPAL INVESTIGATOR]: [total of \$6 Million in research funding for over 50 research projects]

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| <ul style="list-style-type: none"> <li>▪ Imperial Irrigation District/San Diego County Water Authority Water Transfer EIR/EIS – Conservation Modeling</li> <li>▪ Hierarchical Strategies for Recovery of a Salinity-Threatened Irrigated Valley</li> <li>▪ Enhancements to the MODSIM River and Reservoir Operations Model</li> <li>▪ Cooperative Agreement for Hydrologic Model Development and Maintenance</li> <li>▪ Cooperative Agreement: Application of MODSIM to Federal Central Valley Project</li> <li>▪ Identification, Public Awareness, Solution of Waterlogging/Salinity Problems in the Lower Arkansas River Valley, Colorado</li> <li>▪ Development of Decision Support System for Upper Snake River Basin [IPA]</li> <li>▪ Hydropower Unit Scheduling Package for RAMS (Reclamation Alternative Modular SCADA) System</li> <li>▪ Application of CSUDP to Optimal Operation of Colorado River System</li> </ul> | <ul style="list-style-type: none"> <li><i>sponsor:</i> CH2M Hill, Inc. and Imperial Irrigation Company, Brawley, Calif.</li> <li><i>sponsor:</i> U.S. Department of Agriculture, NRICG</li> <li><i>sponsor:</i> U.S. Bureau of Reclamation, Pacific Northwest Region, Boise, Idaho</li> <li><i>sponsor:</i> U.S. Bureau of Reclamation, Pacific Northwest Region, Boise, Idaho</li> <li><i>sponsor:</i> U.S. Bureau of Reclamation, Mid-Pacific Region, Sacramento, California</li> <li><i>sponsor:</i> U.S. Bureau of Reclamation Water Management and Conservation Program</li> <li><i>sponsor:</i> U.S. Bureau of Reclamation, Pacific Northwest Region, Boise, Idaho</li> <li><i>sponsor:</i> U.S. Bureau of Reclamation, Hydroelectric Research and Technical Services Group, Denver, Colo.</li> <li><i>sponsor:</i> U.S. Bureau of Reclamation, Denver, Colo.</li> </ul> | <ul style="list-style-type: none"> <li>[\$83,351]</li> <li>[\$363,000]</li> <li>[\$105,000]</li> <li>[\$570,000]</li> <li>[\$150,000]</li> <li>[\$180,000]</li> <li>[\$188,052]</li> <li>[\$60,000]</li> <li>[\$10,000]</li> </ul> |
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## RESEARCH PROJECTS (Cont.):

- Optimal Selection of Salinity Control Measures in the Colorado River Basin
*sponsor:*  
[\$10,000]
U.S. Bureau of Reclamation,  
Denver, Colo.
- Description and Interpretation of Salinization in the Lower Arkansas River
*sponsor:*  
[\$103,400]
U.S. Geological Survey and Colorado  
Water Resources Research Institute
- Strategies for Mitigating Waterlogging Salinization in Colorado's Lower Arkansas River Valley
*sponsor:*  
[\$49,583]
U.S. Geological Survey and Colorado and  
Water Resources Research Institute
- Optimal Real-Time Pump and Irrigation Scheduling for Center-Pivot Systems
*sponsor:*  
[\$26,818]
Bonneville Power Administration,  
Portland, Ore.
- Evaluation of Alternatives for Dispatcher Training Simulators for Power Systems
*sponsor:*  
[\$9,900]
U.S. Department of Energy, Western  
Area Power Administration, Denver, Colo.
- Impacts of Indexed Sequential Modeling on Hydrogeneration Capacity Estimation
*sponsor:*  
[\$96,130]
U.S. Department of Energy, Western  
Area Power Administration, Denver, Colo.
- Methodology to Improve Regional Exchange of Hydropower Resources
*sponsor:*  
[\$19,971]
U.S. Department of Energy, Western  
Area Power Administration, Denver, Colo.
- Identification of Uses of Increased Streamflow in Rio Grande River Basin
*sponsors:*  
[\$12,000]
Steffen, Robertson, and Kirsten, Inc.;  
USDA-Forest Service
- Comparative Evaluation of Kinematic and Dynamic Flow Routing
*sponsor:*  
[\$10,345]
U.S. Department of Agriculture,  
Agricultural Research Service
- Dynamic Models to Optimize Irrigation Water and Energy Use
*sponsor:*  
[\$37,500]
U.S. Department of Agriculture,  
Agricultural Research Service
- Development of Optimization Models for Scheduling Irrigation
*sponsor:*  
[\$65,000]
U.S. Department of Agriculture,  
Agricultural Research Service
- Mathematical Model for Multilevel Intake Structure Operation
*sponsor:*  
[\$27,148]
U.S. Army Corps of Engineers,  
Waterways Experiment Station
- Methodologies for Operation of Reservoir Systems
*sponsor:*  
[\$29,350]
U.S. Army Corps of Engineers,  
Baltimore District
- Drought Contingency Model for Water Control at Corps Reservoirs
*sponsor:*  
[\$16,490]
U.S. Army Corps of Engineers,  
Ohio River Division
- Optimal Control and Automation in Urban Stormwater Management
*sponsor:*  
[\$100,684]
National Science Foundation,  
Washington D.C.
- Methodologies for Cost-Effective Groundwater Development
*sponsor:*  
[\$50,000]
National Science Foundation,  
Washington D.C.
- Optimal Operation of Complex Water Resource Projects: Upper Pampanga Integrated Irrigation System
*sponsor:*  
[\$44,800]
National Science Foundation,  
International Programs,  
Washington D.C.
- Implementation of Optimal Computer Control for Combined Sewer Systems
*sponsor:*  
[\$130,084]
U.S. Dept. of the Interior, Office of  
Water Research and Technology
- Optimal Design of Real-Time Urban Stormwater Control Systems
*sponsor:*  
[\$81,152]
U.S. Dept. of the Interior, Office of  
Water Research and Technology
- Integration of Hydrologic, Water Quality and Consumptive Use Models
*sponsor:*  
[\$76,322]
U.S. Dept. of the Interior, Office of  
Water Research and Technology
- Optimal Salt Balance Management in the Lower San Luis Rey River Basin
*sponsor:*  
[\$88,180]
U.S. Dept. of the Interior, Office of  
Water Research and Technology
- Development of Colorado River Decision Support System (CRDSS)--Water Rights Planning Model
*sponsor:*  
[\$76,567]
Colorado Water Conservation Board,  
Division of Water Resources, Colo./  
Riverside Technology, Inc.

## RESEARCH PROJECTS (Cont.):

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| ▪ Hydrologic Model of Front Range River Basins   | <i>sponsor:</i><br>[\$10,000]   | Colorado Legislative Council,<br>State of Colorado                  |
| ▪ Optimum Water Storage Strategies for Colorado  | <i>sponsor:</i><br>[ \$32,215]  | Colorado Legislative Council,<br>State of Colorado                  |
| ▪ Graphical-Based Decision Support System for Conjunctive Stream-Aquifer Management under Prior Appropriation                            | <i>sponsor:</i><br>[ \$15,000]  | Colorado Water Resources Research<br>Institute, Colo. State Univ.   |
| ▪ Integration of Water Quantity and Quality in River Basin Modeling  | <i>sponsor:</i><br>[ \$27,000]  | Colorado Water Resources Research<br>Institute, Colo. State Univ.   |
| ▪ Integration of GIS and Conjunctive Stream- Aquifer Management Models   | <i>sponsor:</i><br>[ \$12,000]  | Colorado Water Resources Research<br>Institute, Colo. State Univ.   |
| ▪ Development of the MODSIM River Basin Network Flow Model   | <i>sponsor:</i><br>[ \$12,000]  | Colorado Water Resources Research<br>Institute, Colo. State Univ.   |
| ▪ Voluntary Integrated Basin-wide Water Management: South Platte Basin   | <i>sponsor:</i><br>[ \$70,000]  | Colorado Water Resources Research<br>Institute, Colo. State Univ.   |
| ▪ Managing Irrigation-Induced Salinity and Pollutant Loading to Enhance the Agro-ecosystem of the Lower Arkansas River Basin in Colorado | <i>sponsor:</i><br>[\$126,000]  | Agricultural Experiment Station<br>State of Colorado                |
| ▪ Integration of Water Quantity/Quality in Agricultural Water Transfers  | <i>sponsor:</i><br>[ \$30,000]  | Agricultural Experiment Station,<br>State of Colorado               |
| ▪ Microcomputer Advisory System for Water Control in Irrigation  | <i>sponsor:</i><br>[ \$12,000]  | Agricultural Experiment Station,<br>State of Colorado               |
| ▪ Decision Support System for Regional Water Quantity/Quality Evaluation of BMP's in Irrigated Agriculture                               | <i>sponsor:</i><br>[\$150,000]  | Agricultural Experiment Station,<br>State of Colorado               |
| ▪ Identification and Solution of Water-logging and Salinity Problems in the Lower Arkansas River Valley                                  | <i>sponsor:</i><br>[\$295,000]  | Agricultural Experiment Station,<br>State of Colorado               |
| ▪ Knowledge-Based Optimization via Symbolic Dynamic Programming  | <i>sponsor:</i><br>[ \$80,690]  | U.S. West Advanced Technologies, Inc.,<br>Englewood, Colorado       |
| ▪ Control Software for Metro Seattle Stormwater Management System  | <i>sponsor:</i><br>[ \$26,818]  | Municipality of Seattle (METRO),<br>Seattle, Washington             |
| ▪ Optimal Operation of Colorado-Big Thompson Project   | <i>sponsor:</i><br>[ \$16,000]  | Northern Colorado Water Conservancy<br>District, Loveland, Colorado |
| ▪ Dynamic Programming Analysis of Boulder Reservoir  | <i>sponsor:</i><br>[ \$ 7,068 ] | Northern Colorado Water Conservancy<br>District, Loveland, Colorado |
| ▪ Network Analysis of Raw Water Supplies for Ft. Collins   | <i>sponsor:</i><br>[ \$10,000]  | City of Ft. Collins,<br>Colorado                                    |
| ▪ Application of MODSIM Model to Upper Carson River Basin  | <i>sponsor:</i><br>[ \$10,000]  | Kennedy Jenks, Inc.,<br>Reno, Nevada                                |

## INTERNATIONAL PROJECT EXPERIENCE:

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| ▪ <b>Korea:</b> Korea Water Resources Corporation, Taejon   | <i>Development of Real Time Water Resources Management System</i>  | 2002-2004<br>[\$230,764]   |
| ▪ <b>Egypt:</b> Ministry of Public Works and Water Resources, Cairo; USAID  | <i>Optimal Conjunctive Use of Surface and Groundwater in the Lower Nile Basin</i>                        | 1994-1995<br>[\$62,492]    |
| ▪ <b>Egypt:</b> Ministry of Public Works and Water Resources, Cairo; USBR   | <i>Evaluation of Simulation and Optimization Models for Operation of Nile River System</i>               | 1990-1992<br>[\$22,784]    |
| ▪ <b>Korea:</b> Hyundai Corporation and Chungbuk University, Seoul  | <i>Development of Prototype DSS for Operation of Chungju Reservoir System</i>                            | 1992-1993<br>[\$38,000]    |
| ▪ <b>Dominican Republic:</b> Interamerican Development Bank, Santo Domingo  | <i>Hydrologic Analysis for Sustainable Agriculture in the San Juan River Basin</i>                       | 1992<br>[\$12,000]         |
| ▪ <b>Portugal:</b> Directorate General for Natural Resources, Lisbon  | <i>Development of Decision Support System for Water Management in Portugal</i>                           | 1988-1989<br>[scholarship] |
| ▪ <b>Dominican Republic:</b> World Bank/ Interamerican Institute for Cooperation in Agriculture (IICA), Santo Domingo   | <i>Development of Optimal Normal Operational Strategies for Valdesia Reservoir System</i>                | 1984-1986<br>[\$49,238]    |
| ▪ <b>Bangladesh:</b> Agency for International Development; Winrock International Institute for Agricultural Development | <i>Training Needs Assessment on Systems Approach to Planning and Managing Water Resource Projects</i>    | 1986<br>[\$11,620]         |
| ▪ <b>Philippines:</b> National Irrigation Administration, Manila; NSF, International Programs                           | <i>Optimal Operation of Complex Water Resource Projects: Upper Pampanga Integrated Irrigation System</i> | 1983<br>[\$48,273]         |
| ▪ <b>Cyprus:</b> Project Feasibility Study, World Bank, Nicosia   | <i>Systems Analysis of Water Storage and Conveyance: SCP-VPP Project</i>                                 | 1982-1983<br>[\$15,000]    |
| ▪ <b>Spain:</b> U.S.-Spanish Project; U.S. State Dept; U.S. Bureau of Reclamation                                       | <i>Development and Operation of Conjunctive Use of Surface and Groundwater Systems</i>                   | 1977-1979<br>[\$68,492]    |

## SIGNIFICANT CONSULTING:

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| ▪ South Florida Water Management District, West Palm Beach, Fla.                                      | Updating of OPTI Software for optimal design of stormwater control systems in the St. Lucie estuary and watershed | Nov. 2003 |
| ▪ California Bay-Delta Authority Science Program, Association of Bay Area Governments, Sacramento, CA | Member of CALSIM II External Review Panel   | Nov. 2003 |
| ▪ Office of Research and Development, U.S. Environmental Protection Agency, Washington D. C.          | <i>Peer Reviewer for the 2003 Phase I Small Business Program Solicitation</i>                                     | June 2002 |
| ▪ California State Department of Water Resources, Sacramento, CA                                      | <i>Expert Witness Services</i>  | June 2000 |
| ▪ South Florida Water Management District, West Palm Beach, Fla.                                      | <i>Peer Review of South Florida Water Management Model (SFWMM)</i>  | Feb. 1998 |
| ▪ South Florida Water Management District, West Palm Beach, Fla.                                      | <i>Optimization of Freshwater Inflows to the Caloosahatchee Estuary</i>   | 1996-1997 |
| ▪ South Florida Water Management District, West Palm Beach, Fla.                                      | <i>Optimization of Managed Runoff to the St. Lucie Estuary</i>  | 1994-1995 |
| ▪ Riverside Technology, Inc., Ft. Collins, Colo.  | <i>Water Rights Modeling for the Colorado River Decision Support System (CRDSS)</i>                               | 1994      |
| ▪ Wright Water Engineers, Denver, Colo.   | <i>Application of MODSIM to the Brush Creek Water Rights Study</i>  | 1994      |

## **SIGNIFICANT CONSULTING (Cont.):**

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| ▪ HDR Engineering,<br>El Dorado Hills, Calif   | <i>Evaluation of Application of MODSIM to<br/>California State Water Project</i>  | 1994         |
| ▪ Gronning Engineering Co.,<br>Denver, Colo.   | <i>Application of MODSIM Model to the<br/>Colorado Springs Water Supply System</i>  | 1992-1993    |
| ▪ Center for Water Resources, Chungbuk<br>University; and Korea Water Resources<br>Corporation (KOWACO), Korea | <i>Development of Software for Stochastic<br/>Development of a Water Management<br/>Decision Support System for South Korea</i> | 1992<br>1991 |
| ▪ WMO/UNDP Project, Santo Domingo<br>Dominican Republic  | <i>Software Development for Optimal<br/>Operational Policies for Yaque del Sur Basin</i>  | 1990         |
| ▪ Hydro-Triad, Inc.,<br>Denver, Colo.  | <i>Development of Large Network Model<br/>to Evaluate Yield of Proposed Reservoir</i>   | 1987         |
| ▪ Northern Colorado Water Conservancy<br>District, Loveland, Colo.   | <i>Operational Evaluation of Colorado-Big<br/>Thompson Project--Simulation/Optimization</i>                                     | 1986         |
| ▪ Western Area Power Admin., U.S.<br>Dept. of Energy, Sacramento, Calif.                                       | <i>Application of Indexed Sequential Modeling to<br/>Dependable Hydropower Capacity Estimation</i>                              | 1985         |
| ▪ Hydro-Triad, Inc.,<br>Denver, Colo.  | <i>Application of MODSIM River Basin<br/>Model to Reformulated West Divide Project</i>  | 1985         |
| ▪ Steffen, Robertson and<br>Kirsten, Inc., Denver, Colo.   | <i>Application of MODSIM to Homestake<br/>Mining Company Water Supply System</i>  | 1982-1983    |
| ▪ U. S. Army Corps of Engineers,<br>Vicksburg, Mississippi   | <i>Member of Advisory Group on Military<br/>Hydrology</i>   | 1978         |

## **TEACHING EXPERIENCE AND LAB DEVELOPMENT:**

- Created and taught the following courses in Civil Engineering and Engineering Science:
  - CE 577: GIS in Civil and Environmental Engineering (formerly Urban Water Management)
  - CE 645: Computer-Aided Water Management and Control
  - EG 510: Linear Programming and Network Flows
  - EG 511: Dynamic Programming
  - EG 520: Nonlinear Programming
  - EG 610: Engineering Decision Support and Expert Systems
- Instructor for undergraduate and graduate courses in Civil Engineering and Engineering Science:
  - CE 260: Engineering Mechanics—Statics
  - CE 470: Design Practice II (Faculty Advisor)
  - CE 478: Transportation Engineering
  - CE 546: Water Resource Systems Analysis
  - CE 577: Urban Water Management
  - ME 407: Stochastic Programming
  - EG 505: Analysis of Deterministic Systems (now EG 517)
- Faculty advisor for CE 470 senior design project on *Floodplain Determination Using GIS*; winner of Engineering Days (E-Days) Display Award, 1991.
- Major advisor or co-advisor for 24 Ph.D graduates and 43 M.S. graduates [12 Plan A with thesis]
- Developer and Manager of GIS Engineering Design Lab in the Department of Civil Engineering for instruction, training and research in applications of geographic information systems to civil engineering design, environmental planning and infrastructure systems:

## TRAINING AND CONTINUING EDUCATION EXPERIENCE:

- Lecturer for Postgraduate course in: *Systems Analysis in Water Management* Mar. 2004  
 Interuniversity Program in Water Resources Engineering, Free University of Brussels, Belgium
- Seminar presented at INRS-Water, Land and Environment, University of Quebec, Quebec City, Canada *Optimization of the Probability Distribution of Managed Stormwater Runoff* Mar. 2003
- Special Training in Water Resources Investigation and Planning for KOWACO Engineers, Korea *Decision Support Systems and MODSIM* Sep. 2002
- Training of KOWACO Engineers, Taejon, Korea *Application of MODSIM for Real-Time Water Resources Management* Mar. 2002
- Conducted Workshop for Pacific Northwest Region, U.S. Bureau of Reclamation, Boise, Idaho *MODSIM: River Basin Management Decision Support System* Nov. 2001
- Conducted Training Course for Charles Sutton Latin American Center for Water and Environment, Lima, Peru *Curso de Modelamiento de Simulacion y Optimizacion de Sistemas Hidraulicos* June 2001
- Conducted Training Course for Polytechnic School, University of Sao Paulo and SABESP, Brazil *Decision Support Systems Applied to Water Resources* Nov. 1998
- Lecturer for Postgraduate course in: *Systems Analysis in Water Management* 1991 to 2000  
 Interuniversity Program in Water Resources Engineering, Catholic University of Leuven and Free University of Brussels, Belgium
- ISWR Training Course for Korea Water Resources Corp. and Korea Institute of Construction Technology *Application of MODSIM to River Basin Management in Korea* Dec. 1997
- ISWR Training Course for engineers from Agricultural Engineering Dept., Tamil Nadu, India *Expert Systems for Water Resources Management and Geographic Information Systems* Nov. 1997
- Training for Dr. Saud Abdul-Gader; International Atomic Energy Agency/ National Research Council, Wash. D.C. *Treatment and Disposal of Radioactive Wastes: Application of GIS* Aug. 1997
- Invited Lecturer: *Workshop on Stochastic Control* Oct. 1996  
 University of Sonora, Mexico
- ISWR Training Course for engineers from Central Water and Power Research Station, Pune, India *Decision Support Systems for Water Resources and Irrigation Management* May 1996
- Conducted Training Course on: *Application of Systems Analysis in Water Resources Management* Jan. 1995  
 University of Mexico, Mexico City
- Invited Lecturer in Short Course: *GIS and Civil Engineering* Apr. 1994  
 GIS World, Inc., Ft. Collins, Colo.
- Organizer/Lecturer for Short Course: *Geographic Information Systems, Data Base Management, and Water Resources Systems Analysis* Jun. 1993  
 for professionals from Institute of Water Conservancy and Hydroelectric Power Research, Beijing, China

## TRAINING AND CONTINUING EDUCATION EXPERIENCE (Cont.):

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| <ul style="list-style-type: none"> <li>▪ Organizer/Lecturer for Short Course: International Institute for Civil Engineering, Colo. State Univ.</li> </ul> | <ul style="list-style-type: none"> <li><i>Application of GIS in Water Resources Engineering</i></li> </ul> | <ul style="list-style-type: none"> <li>Jul. 27-Aug.7, 1992</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Invited Lecturer for Short Course: International Institute for Civil Engineering, Colo. State Univ.</li> </ul> | <ul style="list-style-type: none"> <li><i>Water Resources Development and Environmental Protection</i></li> </ul> | <ul style="list-style-type: none"> <li>Jul. 1992</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Organizer/Lecturer for Short Course: International Institute for Civil Engineering, Colo. State Univ.</li> </ul> | <ul style="list-style-type: none"> <li><i>Microcomputers in Water Resources Systems Management</i></li> </ul> | <ul style="list-style-type: none"> <li>Jun. 1992</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Invited Lecturer for: Land Reclamation and Soil Conservation Study Days, ICID, Rome, Italy</li> </ul> | <ul style="list-style-type: none"> <li><i>Experiences in Foreign Watershed Planning</i></li> </ul> | <ul style="list-style-type: none"> <li>Oct. 1991</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Invited Lecturer for GIS World Workshop, Ft. Collins, Colo.</li> </ul> | <ul style="list-style-type: none"> <li><i>Modeling Applications in Geosciences</i></li> </ul> | <ul style="list-style-type: none"> <li>Jul. 29-31, 1991</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Co-Organizer/Lecturer for International Short Course: NR/CE 589, Colo. State Univ., Ft. Collins, Colo.</li> </ul> | <ul style="list-style-type: none"> <li><i>Remote Sensing and GIS for Engineers</i></li> </ul> | <ul style="list-style-type: none"> <li>Jul. 15-Aug.2, 1991</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Co-Organizer for Short Course: International Institute for Civil Engineering, Colo. State Univ.</li> </ul> | <ul style="list-style-type: none"> <li><i>Forecasting and Control of Water Resources Systems</i></li> </ul> | <ul style="list-style-type: none"> <li>Jul. 8-19, 1991</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Organizer/Lecturer for Short Course: International Institute for Civil Engineering, Colo. State Univ.</li> </ul> | <ul style="list-style-type: none"> <li><i>Microcomputers in Water Resources Systems Management</i></li> </ul> | <ul style="list-style-type: none"> <li>Jul. 16-27, 1990</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Organized Training Course on: University of Mexico, Mexico City and University of the Americas, Puebla</li> </ul> | <ul style="list-style-type: none"> <li><i>Optimization Methods for Hydropower Systems Operations</i></li> </ul> | <ul style="list-style-type: none"> <li>1990</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Invited Lecturer in: NATO Advanced Study Institute, Peniscola, Spain</li> </ul> | <ul style="list-style-type: none"> <li><i>Stochastic Hydrology in Water Resources Systems Simulation and Optimization</i></li> </ul> | <ul style="list-style-type: none"> <li>Sep. 1989</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Organizer/Lecturer in Training Course: Ministry of Irrigation, Brasilia, Brazil</li> </ul> | <ul style="list-style-type: none"> <li><i>Optimal Operation of Water Resource Projects</i></li> </ul> | <ul style="list-style-type: none"> <li>Aug. 1988</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Organizer of 3rd ASCE Operations Management Workshop, Colo. State Univ., Ft. Collins, Colo.</li> </ul> | <ul style="list-style-type: none"> <li><i>Computerized Decision Support Systems for Water Managers</i></li> </ul> | <ul style="list-style-type: none"> <li>Jun. 1988</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Organizer/Lecturer for Short Course: International Institute for Civil Engineering, Colo. State Univ.</li> </ul> | <ul style="list-style-type: none"> <li><i>Microcomputers in Water Resources Systems Management</i></li> </ul> | <ul style="list-style-type: none"> <li>May 30-Jun. 9, 1988</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Invited Lecturer for Joint U.S.-Italy Seminar, Cagliari, Italy</li> </ul> | <ul style="list-style-type: none"> <li><i>Urban Storm Drainage</i></li> </ul> | <ul style="list-style-type: none"> <li>1988</li> </ul> |
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| <ul style="list-style-type: none"> <li>▪ Lecturer for Postgraduate course in: Faculty of Agricultural Sciences, Catholic Univ. of Leuven, Belgium</li> </ul> | <ul style="list-style-type: none"> <li><i>Systems Analysis in Irrigation</i></li> </ul> | <ul style="list-style-type: none"> <li>1986-1990</li> </ul> |
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|--|--|--|
| <ul style="list-style-type: none"> <li>▪ Lecturer for Training Course for: Indian Water and Land Management Institutes; Colo. State Univ./USAID</li> </ul> | <ul style="list-style-type: none"> <li><i>India Irrigation Training Program</i></li> </ul> | <ul style="list-style-type: none"> <li>Jul. 27-30, 1987</li> </ul> |
|--|--|--|
- |   |   |  |
|---|---|--|
| <ul style="list-style-type: none"> <li>▪ Conducted Training Course on: Bangladesh University of Engineering Technology, Dhaka; USAID</li> </ul> | <ul style="list-style-type: none"> <li><i>Water Resources Management</i></li> </ul> | <ul style="list-style-type: none"> <li>May 1986</li> </ul> |
|---|---|--|

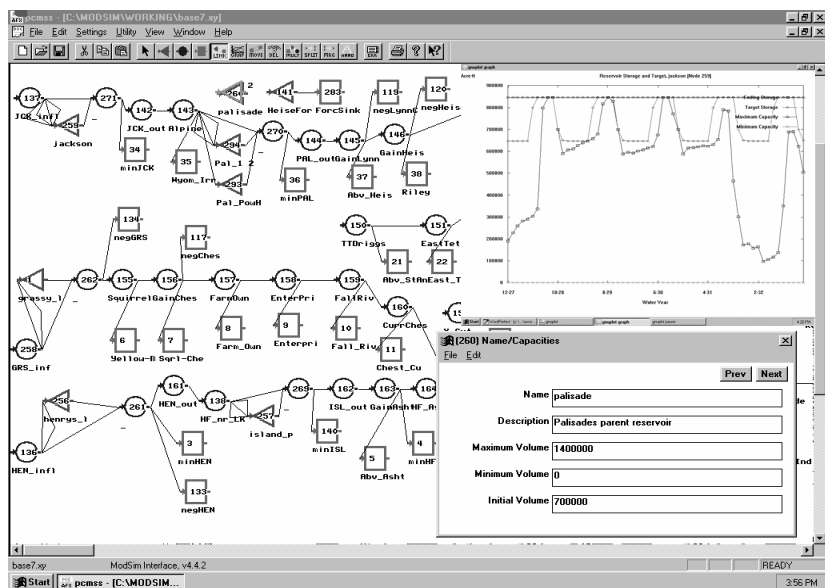
## TRAINING AND CONTINUING EDUCATION EXPERIENCE (Cont.):

- Conducted Training Course on: *Systems Approach to Irrigation* May 1986  
 Bangladesh Agricultural University,  
 Mymensing; USAID
- Organizer/Lecturer for Training on: *Operation of Water Resource Projects:  
 A Systems Approach* Mar. 1986  
 Instituto Nacional de Recursos  
 Hidraulicos, Dominican Republic
- Lecturer in India Irrigation Water *Systems Analysis for Irrigation* 1984  
 Management Training Course,  
 ISARD, Colo. State Univ., Ft. Collins
- Lecturer in Seminar: *Voluntary Basin-Wide Water Management* Apr. 20,  
 1982  
 Colorado Water Resources Research  
 Institute, Colo. State Univ., Ft. Collins
- Organizer/Co-Lecturer on: *Water Resources Management:  
 A Systems Approach* 1981  
 National Irrigation Administration  
 Quezon City, the Philippines
- Organizer/Lecturer for Short Course: *Innovation in Urban Stormwater  
 Management* Jun.29-  
 Jul. 1, 1981  
 Computational Mechanics Centre  
 Southampton, England (with N. Grigg)
- Organizer/Lecturer for Short Course: *Management of Water Resources* Jun. 11-15,  
 1979  
 Computational Mechanics Centre  
 Southampton, England (with W. Hall)
- Organizer for Training Course for *Management of Water Resources:  
 A Systems Approach* Jan. 1979  
 Egypt Water Master Plan; UNDP  
 and World Bank, Cairo, Egypt
- Organizer of Videotape Course and *Management of Water Resources:  
 A Systems Approach* Jul. 5-14,  
 1978  
 Workshop, Colo. State Univ.

## SIGNIFICANT COMPUTER SOFTWARE DEVELOPMENTS:

### ■ MODSIM River Basin Network Flow Model:

MODSIM is a generalized river basin network flow model capable of simultaneously simulating the complex physical, hydrological, and institutional/administrative aspects of river basin management, including water rights. The graphical user interface with MODSIM allows creation of any river basin system topology by simply *clicking on* various icons and placing system *objects* in any desired configuration on screen. Data structures embodied in each model object are controlled by



a data base management system, which is queried by simple mouse activation. Formatted data files are prepared interactively and the network flow optimization is automatically executed from the interface. Results of the optimization are presented in useful graphical plots, and customized functionality can be incorporated through vb.net scripting capabilities.

MODSIM is designed for long term planning (monthly), medium term management (weekly), and short term operations (daily) in river systems, with the latter including hydrologic routing of flows. Conjunctive use of surface water and groundwater and modeling of stream-aquifer interactions are included. Separate analysis is provided for direct flow or natural streamflow rights and seasonal storage rights, including provisions for exchanges, trades and plans for augmentation. MODSIM is written in C/C++ and is implemented for both UNIX-based Workstations as well as MS Windows NT/2000/XP.

Numerous agencies and organizations are currently employing MODSIM for a wide variety of applications, including:

- City of Ft. Collins Water Department
- City of Greeley Water Department
- City of Colorado Springs, Montgomery Watson, Inc., Denver, Colorado
- U.S. Bureau of Reclamation, North Pacific Division, Boise, Idaho
- Northern Colorado Water Conservancy District, Loveland, Colorado
- Kennedy/Jenks, Inc., Reno, Nevada
- Polytechnic School, University of Sao Paulo

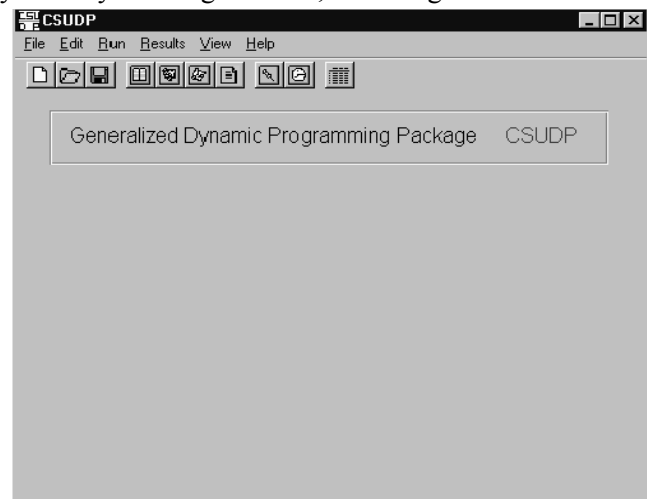
MODSIM may be downloaded from the Internet at: <http://modsim.engr.colostate.edu>

▪ **CSUDP Generalized Dynamic Programming Software Package:**

CSUDP is one of the few generalized dynamic programming software packages currently available. Written in the C language, CSUDP allows user specified definition of system state equations and objective functions, and includes efficient solution procedures for multidimensional problems, stochastic problems, and certain classes of Markov decision processes. A wide variety of computational options are available, including reaching solutions, forward and backward solutions, inverted state equation formulations, splicing and coarse grid options, and development of feedback decision rules.

Many organizations have utilized, or are currently actively utilizing CSUDP, including:

- Technik-Eaucan, Inc., Quebec, Canada
- Acres International Limited, Niagra Falls, Ontario, Canada
- Lahmeyer International Consulting Engineers, Frankfurt, Germany
- Department of Operations Research, University of Mexico, Mexico City
- U.S. Bureau of Reclamation, Denver Office, Denver, Colorado
- Department of Civil Engineering, University of Colorado at Denver, Denver, Colorado
- Riverside Technology, Inc., Ft. Collins, Colorado
- Polytechnic School, University of Sao Paulo



CSUDP is highlighted in: *Encyclopedia of Microcomputers*, Vol. 5, A. Kent and J. Williams (eds.), Marcel Dekker, Inc., New York, pp. 275-338 (1990). CSUDP may be downloaded from the Internet at <ftp://modsim.engr.colostate.edu/CE/csudp/>

## PUBLICATIONS:

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- Labadie, J.**, "Optimal Operation of Multi-Reservoir Systems: State of the Art Review," *Journal of Water Resources Planning and Management*, ASCE, 130(2), pp. 93-111 (2004).
- Yi, J, **J. Labadie**, and S. Stitt, "Dynamic Optimal Unit Commitment and Loading in Hydropower Systems," *Journal of Water Resources Planning and Management*, ASCE, 129(5), pp. 388-398 (2003).
- Shim, K-C, D. Fontane and **J. Labadie**, "Spatial Decision Support System for Integrated River Basin Flood Control," *Journal of Water Resources Planning and Management*, ASCE, 128(3), pp. 190-201 (2002).
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- Kipkorir, E., D. Raes, and **J. Labadie**, "Optimal Allocation of Short-Term Irrigation Supply," *Irrigation and Drainage Systems*, 15, pp. 247-267 (2001)
- Labadie, J.** and M. Baldo, Discussion of: "Priority Preserving Unit Penalties in Network Flow Modeling," by M. Israel and J. Lund, *Journal of Water Resources Planning and Management*, 125(5), pp. 67-68 (Jan/Feb 2001).
- Dai, T. and **J. Labadie**, "River Basin Network Model for Integrated Water Quantity/Quality Management," *Journal of Water Resources Planning and Management*, ASCE, 127(5), pp. 295-305 (Sep/Oct 2001).
- Ouarda, T. and **J. Labadie**, "Chance-Constrained Optimal Control for Multi-reservoir System Optimization and Risk Analysis," *Stochastic Environmental Research and Risk Assessment*, 15(3), pp.185-204 (June 2001).
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- Labadie, J.**, "Reservoir System Optimization Models," *Water Resources Update Journal*, Universities Council on Water Resources (UCOWR), Issue 107, Southern Illinois Univ., Carbondale, Ill. (Spring 1998).
- El-Awar, F., **J. Labadie**, and T. Ouarda, "Stochastic Differential Dynamic Programming for Multi-Reservoir System Control," *Journal of Stochastic Hydrology and Hydraulics*, Vol. 12, pp. 247-266 (Sep. 1998).
- Hayes, D. **J. Labadie**, T. Sanders, and J. Brown, "Enhancing Water Quality in Hydropower System Operations," *Water Resources Research*, Vol. 34, No. 3, pp. 471-483 (Mar. 1998).
- Fredericks, J., **J. Labadie**, and J. Altenhofen, "Decision Support System for Conjunctive Stream-Aquifer Management," *Journal of Water Resources Planning and Management*, ASCE, Vol. 124, No. 2 (Mar./Apr. 1998).
- Labadie, J.**, "Optimal Control of Hydrosystems," by Larry W. Mays, Book Review, *Journal of Hydraulic Engineering*, ASCE, Vol. 123, No. 12, pp. 1176-1177 (Dec. 1997).
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- Taher, S. and **J. Labadie**, "Optimal Design of Water Distribution Networks with GIS," *Journal of Water Resources Planning and Management*, ASCE, Vol. 122, No. 4, pp. 301-311, (Jul. 1996).
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- Labadie, J.** and J. Dracup, "Optimal Identification of Lumped Watershed Models," *Water Resources Research*, Vol. 5, No. 3, pp. 583-590 (Jun. 1969).

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- Burkhalter, J., T. Gates, and **J. Labadie**, "Modeling and Analysis of Saline High Water Table Problems in the Lower Arkansas River Valley, Colorado," *Colorado Water*, Colorado Water Resources Research Institute, Colorado State University, Ft. Collins, CO (June 2000).
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- Triana, E., **J. Labadie** and T. Gates, "Conjunctive Stream-Aquifer Modeling Using Artificial Neural Networks," *Proceedings of the World Water and Environmental Resources Congress*, EWRI and ASCE, Philadelphia, PA, June 22-26 (2003).
- Rieker, J., **J. Labadie**, and K. Fagot, "Visualizing the Impact of Control of the Lower Colorado River," *Proceedings of the 2002 ESRI International User Conference*, San Diego, Calif. (July 7-12, 2002).

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