

VITAE

John W. Labadie

CURRENT POSITION:

Professor

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

Graduate Program Coordinator

BUSINESS ADDRESS:

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

DATE OF BIRTH:

November 29, 1942

EDUCATION:

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

PROFESSIONAL HISTORY:

- Coordinator, Water Resources 1991 to present Department of Civil and Environmental
Planning and Management Division Engineering, Colorado State University
- Professor 1982 to present Department of Civil and Environmental
Associate Professor 1977 to 1982 Engineering, Colorado State University
Assistant Professor 1972 to 1977
- Visiting Professor 1991 to 2007 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 U.S. Army Corps of Engineers
Reservoir Control Center Cincinnati, Ohio

PROFESSIONAL REGISTRATION:

- Registered Professional Engineer State of Colorado, #13210

MEMBERSHIPS AND AFFILIATIONS:

- Life Member, American Society of Civil Engineers (ASCE)
 - Editor, ASCE *Journal of Water Resources Planning and Management* (2000 to 2004)
 - Associate Editor, ASCE *Journal of Water Resources Planning and Management* (1998-2000)
 - Organized 3rd Operations Management Workshop on *Computerized Decision Support Systems for Water Managers*, Colorado State University, 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) (1972 – 1995)
- 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:

- Winner, 2005 Faculty Award for Excellence in Research
Department of Civil and Environmental Engineering
Colorado State University
- Winner, 1998 Annual Paper Award Best Practice-Oriented Paper
Journal of Water Resources Planning and Management
American Society of Civil Engineers
- Winner of Fulbright Research Scholarship, 1988
Directorate General for Natural Resources
Lisbon, Portugal
- Voted, 1982 Outstanding Civil Engineering Faculty Member
in Competition for Halliburton Award, College of Engineering, Colorado State University
- Winner, 1978 Annual Paper Award
American Society of Agricultural Engineers
- Listed in *Who's Who in Engineering*
Ninth Edition

RESEARCH PROJECTS [PRINCIPAL/CO-PRINCIPAL INVESTIGATOR]:

[Total of \$7 Million in research funding for over 50 research projects]

- Efficiency/Performance Improvement of Colorado Springs Utilities MODSIM Daily Model for Water Supply Analysis
sponsor: [\$43,238] Colorado Springs Utilities, City of Colorado Springs, Colorado
- Data Collection and Assessment in Support of Improved Water Management in the Arkansas River Basin
sponsor: [\$599,931] Colorado State Water Conservation Board, Denver, Colorado
- Borland Research Instrumentation and Equipment Grant
sponsor: [\$11,761] Borland Foundation
- IID Efficiency Conservation Definite Plan
sponsor: [\$60,000] Davids Engineering Inc. and Imperial Irrigation District, Brawley, Calif.
- IID/San Diego Co. Water Transfer EIR/EIS Conservation Modeling
sponsor: [\$83,351] CH2M Hill, Inc. and Imperial Irrigation District, Brawley, Calif.
- Hierarchical Strategies for Recovery of a Salinity-Threatened Irrigated Valley
sponsor: [\$363,000] U.S. Department of Agriculture, NRICG
- MODSIM Model Code and GUI Enhancements
sponsor: [\$120,000] U.S. Bureau of Reclamation, Pacific Northwest Region, Boise, Idaho
- Enhancements to the MODSIM River and Reservoir Operations Model
sponsor: [\$105,000] U.S. Bureau of Reclamation, Pacific Northwest Region, Boise, Idaho

RESEARCH PROJECTS (cont.):

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| ▪ Cooperative Agreement: Hydrologic Model Development and Maintenance | <i>sponsor:</i>
[\$570,000] | U.S. Bureau of Reclamation, Pacific Northwest Region, Boise, Idaho |
| ▪ Cooperative Agreement: Application of MODSIM to Federal Central Valley Project | <i>sponsor:</i>
[\$150,000] | U.S. Bureau of Reclamation, Mid-Pacific Region, Sacramento, California |
| ▪ Identification and Solution of Waterlogging and Salinity Problems in the Lower Arkansas River Valley | <i>sponsor:</i>
[\$50,000] | U.S. Bureau of Reclamation, Water Conservation Field Service Program |
| ▪ Identification, Public Awareness, Solution of Waterlogging/Salinity Problems in the Lower Arkansas River Valley, Colorado | <i>sponsor:</i>
[\$180,000] | U.S. Bureau of Reclamation Water Management and Conservation Program |
| ▪ Development of Decision Support System for Upper Snake River Basin [IPA] | <i>sponsor:</i>
[\$188,052] | U.S. Bureau of Reclamation, Pacific Northwest Region, Boise, Idaho |
| ▪ Hydropower Unit Scheduling Package for RAMS (Reclamation Alternative Modular SCADA) System | <i>sponsor:</i>
[\$60,000] | U.S. Bureau of Reclamation, Hydroelectric Research and Technical Services Group, Denver, CO |
| ▪ Application of CSUDP to Optimal Operation of Colorado River System | <i>sponsor:</i>
[\$10,000] | U.S. Bureau of Reclamation, Denver, CO |
| ▪ Optimal Selection of Salinity Control Measures in the Colorado River Basin | <i>sponsor:</i>
[\$10,000] | U.S. Bureau of Reclamation, Denver, CO |
| ▪ Evaluating Strategies to Mitigate Waterlogging and Salinization in Colorado's Lower Arkansas River Valley | <i>sponsor:</i>
[\$51,749] | U.S. Geological Survey and Colorado Water Resources Research Institute |
| ▪ Description and Interpretation of Salinization in the Lower Arkansas River | <i>sponsor:</i>
[\$103,400] | U.S. Geological Survey and Colorado Water Resources Research Institute |
| ▪ Strategies for Mitigating Waterlogging and Salinization in Colorado's Lower Arkansas River Valley | <i>sponsor:</i>
[\$49,583] | U.S. Geological Survey and Colorado Water Resources Research Institute |
| ▪ Optimal Real-Time Pump and Irrigation Scheduling for Center-Pivot Systems | <i>sponsor:</i>
[\$26,818] | Bonneville Power Administration, Portland, Ore. |
| ▪ Evaluation of Alternatives for Dispatcher Training Simulators for Power Systems | <i>sponsor:</i>
[\$9,900] | U.S. Department of Energy, Western Area Power Admin., Denver, CO |
| ▪ Impacts of Indexed Sequential Modeling on Hydrogeneration Capacity Estimation | <i>sponsor:</i>
[\$96,130] | U.S. Department of Energy, Western Area Power Administration, Denver CO |
| ▪ Methodology to Improve Regional Exchange of Hydropower Resources | <i>sponsor:</i>
[\$19,971] | U.S. Department of Energy, Western Area Power Administration, Denver, CO |
| ▪ Identification of Uses of Increased Streamflow in Rio Grande River Basin | <i>sponsors:</i>
[\$12,000] | Steffen, Robertson, and Kirsten, Inc.; USDA-Forest Service |
| ▪ Comparative Evaluation of Kinematic and Dynamic Flow Routing | <i>sponsor:</i>
[\$10,345] | U.S. Department of Agriculture, Agricultural Research Service |
| ▪ Dynamic Models to Optimize Irrigation Water and Energy Use | <i>sponsor:</i>
[\$37,500] | U.S. Department of Agriculture, Agricultural Research Service |
| ▪ Development of Optimization Models for Scheduling Irrigation | <i>sponsor:</i>
[\$65,000] | U.S. Department of Agriculture, Agricultural Research Service |
| ▪ Mathematical Model for Multilevel Intake Structure Operation | <i>sponsor:</i>
[\$27,148] | U.S. Army Corps of Engineers, Waterways Experiment Station |

RESEARCH PROJECTS (cont.):

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| ▪ Methodologies for Operation of Reservoir Systems | <i>sponsor:</i>
[\$29,350] | U.S. Army Corps of Engineers,
Baltimore District |
| ▪ Drought Contingency Model for Water Control at Corps Reservoirs | <i>sponsor:</i>
[\$16,490] | U.S. Army Corps of Engineers,
Ohio River Division |
| ▪ Optimal Control and Automation in Urban Stormwater Management | <i>sponsor:</i>
[\$100,684] | National Science Foundation,
Washington D.C. |
| ▪ Methodologies for Cost-Effective Groundwater Development | <i>sponsor:</i>
[\$50,000] | National Science Foundation,
Washington D.C. |
| ▪ Optimal Operation of Complex Water Resource Projects: Upper Pampanga Integrated Irrigation System | <i>sponsor:</i>
[\$44,800] | National Science Foundation,
International Programs,
Washington D.C. |
| ▪ Implementation of Optimal Computer Control for Combined Sewer Systems | <i>sponsor:</i>
[\$130,084] | U.S. Dept. of the Interior, Office of
Water Research and Technology |
| ▪ Optimal Design of Real-Time Urban Stormwater Control Systems | <i>sponsor:</i>
[\$81,152] | U.S. Dept. of the Interior, Office of
Water Research and Technology |
| ▪ Integration of Hydrologic, Water Quality and Consumptive Use Models | <i>sponsor:</i>
[\$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 | <i>sponsor:</i>
[\$88,180] | U.S. Dept. of the Interior, Office of
Water Research and Technology |
| ▪ Development of Colorado River Decision Support System (CRDSS) | <i>sponsor:</i>
[\$76,567] | Colorado Water Conservation Board,
Division of Water Resources, CO |
| ▪ Hydrologic Model of Front Range River Basins | <i>sponsor:</i>
[\$10,000] | Colorado Legislative Council,
State of Colorado |
| ▪ Optimum Water Storage Strategies for Colorado | <i>sponsor:</i>
[\$32,215] | Colorado Legislative Council,
State of Colorado |
| ▪ Graphical-Based Decision Support System for Conjunctive Stream-Aquifer Management under Prior Appropriation | <i>sponsor:</i>
[\$15,000] | Colorado Water Resources Research
Institute, Colorado State University |
| ▪ Integration of Water Quantity and Quality in River Basin Modeling | <i>sponsor:</i>
[\$27,000] | Colorado Water Resources Research
Institute, Colorado State University |
| ▪ Integration of GIS and Conjunctive Stream- Aquifer Management Models | <i>sponsor:</i>
[\$12,000] | Colorado Water Resources Research
Institute, Colorado State University |
| ▪ Development of the MODSIM River Basin Network Flow Model | <i>sponsor:</i>
[\$12,000] | Colorado Water Resources Research
Institute, Colorado State University |
| ▪ Voluntary Integrated Basin-wide Water Management: South Platte Basin | <i>sponsor:</i>
[\$70,000] | Colorado Water Resources Research
Institute, Colorado State University |
| ▪ Managing Irrigation-Induced Salinity and Pollutant Loadings | <i>sponsor:</i>
[\$126,000] | Agricultural Experiment Station
State of Colorado |
| ▪ Integration of Water Quantity/Quality in Agricultural Water Transfers | <i>sponsor:</i>
[\$30,000] | Agricultural Experiment Station,
State of Colorado |
| ▪ Microcomputer Advisory System for Water Control in Irrigation | <i>sponsor:</i>
[\$12,000] | Agricultural Experiment Station,
State of Colorado |
| ▪ Decision Support System for Regional Water Quantity/Quality Evaluation of BMP's in Irrigated Agriculture | <i>sponsor:</i>
[\$150,000] | Agricultural Experiment Station,
State of Colorado |

RESEARCH PROJECTS (cont.):

- Solution of Waterlogging and Salinity Problems in Lower Arkansas River
sponsor: Agricultural Experiment Station, State of Colorado
[\$295,000]
- Knowledge-Based Optimization via Symbolic Dynamic Programming
sponsor: U.S. West Advanced Technologies, Inc., Englewood, Colorado
[\$80,690]
- Control Software for Metro Seattle Stormwater Management System
sponsor: Municipality of Seattle (METRO), Seattle, Washington
[\$26,818]
- Optimal Operation of Colorado-Big Thompson Project
sponsor: Northern Colorado Water Conservancy District, Loveland, Colorado
[\$16,000]

INTERNATIONAL PROJECT EXPERIENCE:

- **Korea:** Korea Water Resources Corporation, Taejon, South Korea
Advanced Application of K-MODSIM for Basin-Wide Optimal Water Allocation 2005-2007
[\$185,698]
- **Korea:** Korea Water Resources Corporation, Taejon, South Korea
Development of Real Time Water Resources Management System 2002-2004
[\$230,764]
- **Egypt:** Ministry of Public Works and Water Resources, Cairo; USAID
Optimal Conjunctive Use of Surface and Groundwater in the Lower Nile Basin 1994-1995
[\$62,492]
- **Egypt:** Ministry of Public Works and Water Resources, Cairo; USBR
Evaluation of Simulation and Optimization Models for Operation of Nile River System 1990-1992
[\$22,784]
- **Korea:** Hyundai Corporation and Chungbuk University, Seoul, South Korea
Development of Prototype DSS for Operation of Chungju Reservoir System 1992-1993
[\$38,000]
- **Dominican Republic:** Interamerican Development Bank, Santo Domingo
Hydrologic Analysis for Sustainable Agriculture in the San Juan River Basin 1992
[\$12,000]
- **Portugal:** Directorate General for Natural Resources, Lisbon
Development of Decision Support System for Water Management in Portugal 1988-1989
[scholarship]
- **Dominican Republic:** World Bank/ Interamerican Institute for Cooperation in Agriculture (IICA), Santo Domingo
Development of Optimal Normal Operational Strategies for Valdesia Reservoir System 1984-1986
[\$49,238]
- **Bangladesh:** Agency for International Development; Winrock International Institute for Agricultural Development
Training Needs Assessment on Systems Approach to Planning and Managing Water Resource Projects 1986
[\$11,620]
- **Philippines:** National Irrigation Administration, Manila; NSF, International Programs
Optimal Operation of Complex Water Resource Projects: Upper Pampanga Integrated Irrigation System 1983
[\$48,273]
- **Cyprus:** Project Feasibility Study, World Bank, Nicosia
Systems Analysis of Water Storage and Conveyance: SCP-VPP Project 1982-1983
[\$15,000]
- **Spain:** U.S.-Spanish Project; U.S. State Dept; U.S. Bureau of Reclamation
Development and Operation of Conjunctive Use of Surface and Groundwater Systems 1977-1979
[\$68,492]

SIGNIFICANT CONSULTING:

▪ South Florida Water Management District, West Palm Beach, Fla	<i>Optimal Configuration of Reservoir-assisted STA's in the St. Lucie Watershed</i>	Sep. 2009
▪ South Florida Water Management District, West Palm Beach, Fla	<i>Development of Optimal Operational Rules for North Fork Basin Project</i>	Nov. 2006
▪ South Florida Water Management District, West Palm Beach, Fla	<i>Flow Optimization for Loxahatchee Restoration</i>	Nov. 2004
▪ South Florida Water Management District, West Palm Beach, Fla.	<i>Optimal Design of Stormwater Control Systems in the St. Lucie Estuary and Watershed</i>	Nov. 2003
▪ California Bay-Delta Authority, Association of Bay Area Governments	<i>Member of CALSIM II External Review Panel</i>	Nov. 2003
▪ Office of Research and Development, U.S. EPA, 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, CO	<i>Water Rights Modeling for the Colorado River Decision Support System (CRDSS)</i>	1994
▪ Wright Water Engineers, Denver, CO	<i>Application of MODSIM to the Brush Creek Water Rights Study</i>	1994
▪ HDR Engineering, El Dorado Hills, Calif	<i>Evaluation of Application of MODSIM to California State Water Project</i>	1994
▪ Gronning Engineering Co., Denver, CO	<i>Application of MODSIM Model to the Colorado Springs Water Supply System</i>	1992-1993
▪ Center for Water Resources Chungbuk University, Korea	<i>Development of Software for Stochastic Optimization of Water Resource Systems</i>	1992
▪ Korea Water Resources Corporation (KOWACO), Daejong, Korea	<i>Development of a Water Management Decision Support System for South Korea</i>	1991
▪ WMO/UNDP Project, Santo Domingo Dominican Republic	<i>Software Development for Optimal Operational Policies for Yaque del Sur Basin</i>	1990
▪ Hydro-Triad, Inc., Denver, CO	<i>Development of Large Network Model to Evaluate Yield of Proposed Reservoir</i>	1987
▪ Northern Colorado Water Conservancy District, Loveland, CO	<i>Operational Evaluation of Colorado-Big Thompson Project--Simulation/Optimization</i>	1986
▪ Western Area Power Admin., U.S. Dept. of Energy, Sacramento, Calif.	<i>Application of Indexed Sequential Modeling to Dependable Hydropower Capacity Estimation</i>	1985
▪ Hydro-Triad, Inc., Denver, CO	<i>Application of MODSIM River Basin Model to Reformulated West Divide Project</i>	1985
▪ Steffen, Robertson and Kirsten, Inc., Denver, CO	<i>Application of MODSIM to Homestake Mining Company Water Supply System</i>	1982-1983

TEACHING EXPERIENCE AND GRADUATE SUPERVISION:

- Creator and instructor for the following courses in Civil and Environmental Engineering and General Engineering:
 - CIVE 577: GIS in Civil and Environmental Engineering
 - CIVE 645: Computer-Aided Water Management and Control
 - ENGR 510: Linear Programming and Network Flows
 - MATH 520: Nonlinear Programming
 - ENGR 520: Engineering Decision Support and Expert Systems
- Instructor for undergraduate and graduate courses in Civil and Environmental Engineering
 - CIVE 260: Engineering Mechanics—Statics
 - CIVE 322: Basic Hydrology
 - CIVE 403: Senior Project Design (Faculty Advisor)
 - CIVE 546: Water Resource Systems Analysis
- Faculty advisor for CIVE 403 (formerly 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 28 Ph.D graduates and 52 M.S. graduates [14 Plan A with thesis]
- Developer and Manager of GIS Engineering Design Lab in the Department of Civil Engineering

TRAINING AND CONTINUING EDUCATION EXPERIENCE:

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| ▪ Workshop for KWater Engineers, Korea Water Resources Corporation Taejon, Korea | <i>Recent Trends of R&D, Applications, and Future Directions of Water Resources Systems Analysis</i> | Jan. 11-13
2011 |
| ▪ Participants from Colorado Springs Utilities, Northern Colorado Water Conservancy District, MWH Global | <i>Training in Usage of MODSIM and GeoMODSIM</i> | May 28-30
2008 |
| ▪ Curso Taller Gestión de Riesgos Técnicos en Generación Hidroeléctrica, Gërens Escuela de Gestión y Economía, Lima, Peru | <i>Hydropower Optimization using MODSIM and CSUDP</i> | July 9-10
2007 |
| ▪ Training of KWater Engineers, Taejon, South Korea | <i>Application of KMODSIM to Integrated Basin Water Resources</i> | June 4-8
2007 |
| ▪ Training on concepts and usage of MODSIM Generalized River, Boyle Engineering, Lakewood CO | <i>MODSIM Generalized River Basin Model</i> | Jan 4-5,
2007 |
| ▪ Interuniversity Program in Water Resources Engineering, Free University of Brussels, Belgium | <i>Systems Analysis in Water Management</i> | Mar. 2003-
2006 |
| ▪ Seminar presented at INRS-Water, Land and Environment, University of Quebec, Quebec City, Canada | <i>Optimization of the Probability Distribution of Managed Stormwater Runoff</i> | Mar. 2003 |
| ▪ Special Training in Water Resources Investigation and Planning for KOWACO Engineers, South Korea | <i>Decision Support Systems and MODSIM</i> | Sep. 2002 |
| ▪ Training of KOWACO Engineers, Taejon, South Korea | <i>Application of MODSIM for Real-Time Water Resources Management</i> | Mar. 2002 |
| ▪ Conducted Workshop for Pacific Northwest Region, U.S. Bureau of Reclamation, Boise, Idaho | <i>MODSIM: River Basin Management Decision Support System</i> | Nov. 2001 |

TRAINING AND CONTINUING EDUCATION EXPERIENCE (cont.):

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| ▪ Training Course for Charles Sutton Latin American Center for Water and Environment, Lima, Peru | <i>Curso de Modelamiento de Simulacion y Optimizacion de Sistemas Hidraulicos</i> | June 2001 |
| ▪ Conducted Training Course for Polytechnic School, University of Sao Paulo and SABESP, Brazil | <i>Decision Support Systems Applied to Water Resources</i> | Nov. 1998 |
| ▪ Lecturer for Postgraduate course in: Interuniversity Program in Water Resources Engineering, Catholic University of Leuven, Belgium | <i>Systems Analysis in Water Management</i> | 1991 - 2000 |
| ▪ ISWR Training Course for Korea Water Resources Corp. and Korea Institute of Construction Technology | <i>Application of MODSIM to River Basin Management in Korea</i> | Dec. 1997 |
| ▪ ISWR Training Course for engineers from Agricultural Engineering Dept., Tamil Nadu, India | <i>Expert Systems for Water Resources Management and Geographic Information Systems</i> | Nov. 1997 |
| ▪ Training for Dr. Saud Abdul-Gader; International Atomic Energy Agency/ National Research Council, Wash. D.C. | <i>Treatment and Disposal of Radioactive Wastes: Application of GIS</i> | Aug. 1997 |
| ▪ Invited Lecturer: University of Sonora, Mexico | <i>Workshop on Stochastic Control</i> | Oct. 1996 |
| ▪ ISWR Training Course for engineers from Central Water and Power Research Station, Pune, India | <i>Decision Support Systems for Water Resources and Irrigation Management</i> | May 1996 |
| ▪ Conducted Training Course on: University of Mexico, Mexico City | <i>Application of Systems Analysis in Water Resources Management</i> | Jan. 1995 |
| ▪ Invited Lecturer in Short Course: GIS World, Inc., Ft. Collins, CO | <i>GIS and Civil Engineering</i> | Apr. 1994 |
| ▪ Organizer/Lecturer for Short Course: for professionals from Institute of Water Conservancy and Hydro - Power Research, Beijing, China | <i>Geographic Information Systems, Data Base Management, and Water Resources Systems Analysis</i> | Jun. 1993 |
| ▪ Organizer/Lecturer for Short Course: International Institute for Civil Engineering, Colorado State University | <i>Application of GIS in Water Resources Engineering</i> | Jul. 27-
Aug7, 1992 |
| ▪ Invited Lecturer for Short Course: International Institute for Civil Engineering, Colorado State University | <i>Water Resources Development and and Environmental Protection</i> | Jul. 1992 |
| ▪ Organizer/Lecturer for Short Course: International Institute for Civil Engineering, Colorado State University | <i>Microcomputers in Water Resources Systems Management</i> | Jun. 1992 |
| ▪ Invited Lecturer for: Land Reclamation and Soil Conservation Study Days, ICID, Rome, Italy | <i>Experiences in Foreign Watershed Planning</i> | Oct. 1991 |
| ▪ Invited Lecturer for GIS World Workshop, Ft. Collins, CO | <i>Modeling Applications in Geosciences</i> | Jul. 29-31,
1991 |

TRAINING AND CONTINUING EDUCATION EXPERIENCE (cont.):

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| <ul style="list-style-type: none"> ▪ Co-Organizer/Lecturer for Short Course: NR/CE 589, Colorado State University, Ft. Collins CO | <p><i>Remote Sensing and GIS for Engineers</i></p> | <p>Jul. 15-Aug.2, 1991</p> |
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| <ul style="list-style-type: none"> ▪ Co-Organizer for Short Course: International Institute for Civil Engineering, Colorado State Univ. | <p><i>Forecasting and Control of Water Resources Systems</i></p> | <p>Jul. 8-19, 1991</p> |
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| <ul style="list-style-type: none"> ▪ Organizer/Lecturer for Short Course: International Institute for Civil Engineering, Colorado State Univ. | <p><i>Microcomputers in Water Resources Systems Management</i></p> | <p>Jul. 16-27, 1990</p> |
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| <ul style="list-style-type: none"> ▪ Organized Training Course on: University of Mexico, Mexico City and University of the Americas, Puebla | <p><i>Optimization Methods for Hydropower Systems Operations</i></p> | <p>1990</p> |
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| <ul style="list-style-type: none"> ▪ Invited Lecturer at: NATO Advanced Study Institute, Peniscola, Spain | <p><i>Stochastic Hydrology in Water Resources Systems Simulation and Optimization</i></p> | <p>Sep. 1989</p> |
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| <ul style="list-style-type: none"> ▪ Organizer/Lecturer in Training Course: Ministry of Irrigation, Brasilia, Brazil | <p><i>Optimal Operation of Water Resource Projects</i></p> | <p>Aug. 1988</p> |
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| <ul style="list-style-type: none"> ▪ Organizer of 3rd ASCE Operations Management Workshop, Colorado State University, Ft. Collins, CO | <p><i>Computerized Decision Support Systems for Water Managers</i></p> | <p>Jun. 1988</p> |
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| <ul style="list-style-type: none"> ▪ Organizer/Lecturer for Short Course: International Institute for Civil Engineering, Colorado State Univ. | <p><i>Microcomputers in Water Resources Systems Management</i></p> | <p>May 30-Jun. 9, 1988</p> |
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| <ul style="list-style-type: none"> ▪ Invited Lecturer for Joint U.S.-Italy Seminar, Cagliari, Italy | <p><i>Urban Storm Drainage</i></p> | <p>1988</p> |
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| <ul style="list-style-type: none"> ▪ Lecturer for Postgraduate course in: Faculty of Agricultural Sciences, Catholic University of Leuven, Belgium | <p><i>Systems Analysis in Irrigation</i></p> | <p>1986-1990</p> |
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| <ul style="list-style-type: none"> ▪ Lecturer for Training Course for: Indian Water and Land Management Institutes; CSU/USAID | <p><i>India Irrigation Training Program</i></p> | <p>Jul. 27-30, 1987</p> |
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| <ul style="list-style-type: none"> ▪ Conducted Training Course on: Bangladesh University of Engineering Technology, Dhaka; USAID | <p><i>Water Resources Management</i></p> | <p>May 1986</p> |
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| <ul style="list-style-type: none"> ▪ Conducted Training Course on: Bangladesh Agricultural University, Mymensing; USAID | <p><i>Systems Approach to Irrigation</i></p> | <p>May 1986</p> |
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| <ul style="list-style-type: none"> ▪ Organizer/Lecturer for Training on: Instituto Nacional de Recursos Hidraulicos, Dominican Republic | <p><i>Operation of Water Resource Projects: A Systems Approach</i></p> | <p>Mar. 1986</p> |
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|---|---|-------------|
| <ul style="list-style-type: none"> ▪ Lecturer in India Irrigation Water Management Training Course, ISARD, Colorado State University | <p><i>Systems Analysis for Irrigation</i></p> | <p>1984</p> |
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| <ul style="list-style-type: none"> ▪ Lecturer in Seminar: Colorado Water Resources Research Institute, Colorado State University | <p><i>Voluntary Basin-Wide Water Management</i></p> | <p>Apr. 20, 1982</p> |
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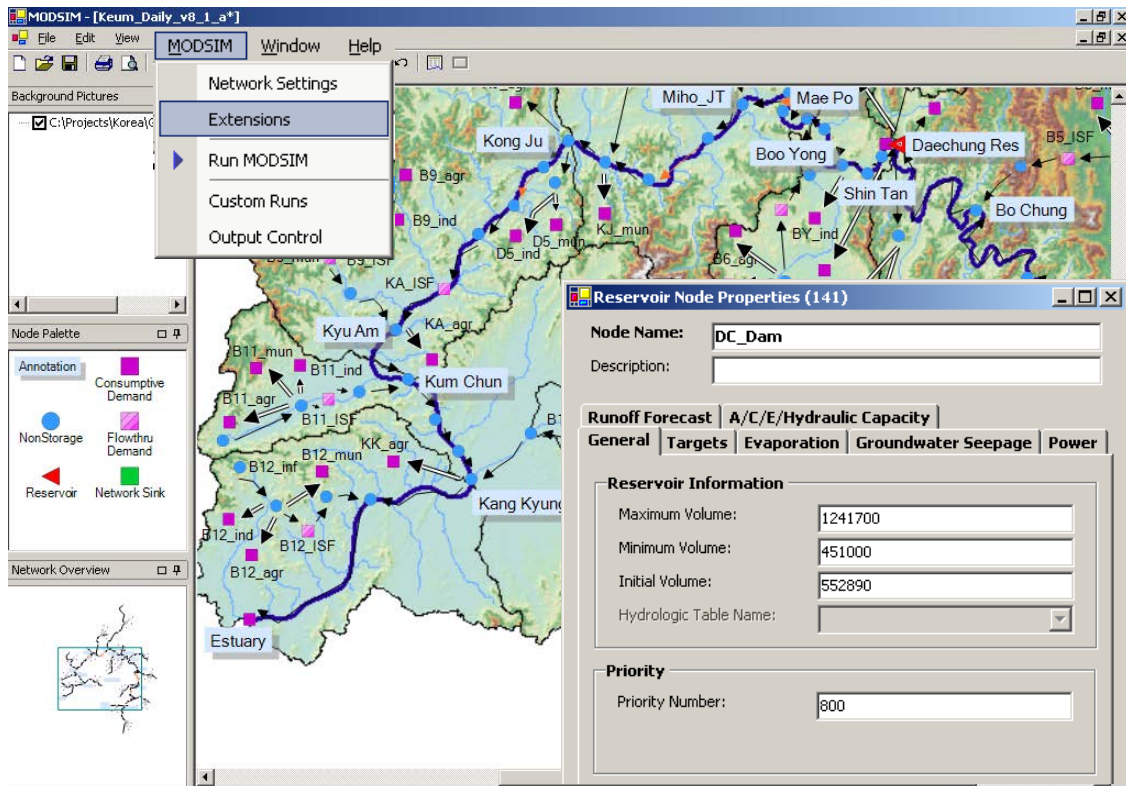
TRAINING AND CONTINUING EDUCATION EXPERIENCE (cont.):

- Organizer/Co-Lecturer on: *Water Resources Management:* 1981
National Irrigation Administration *A Systems Approach*
Quezon City, the Philippines
- Organizer/Lecturer for Short Course: *Innovation in Urban Stormwater* Jun.29-
Computational Mechanics Centre *Management* Jul. 1, 1981
Southampton, England (with N. Grigg)
- Organizer/Lecturer for Short Course: *Management of Water Resources* Jun. 11-15,
Computational Mechanics Centre 1979
Southampton, England (with W. Hall)
- Organizer for Training Course for *Management of Water Resources:* Jan. 1979
Egypt Water Master Plan; UNDP *A Systems Approach*
and World Bank, Cairo, Egypt
- Organizer of Videotape Course and *Management of Water Resources:* Jul. 5-14,
Workshop, Colorado State Univ. *A Systems Approach* 1978

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.

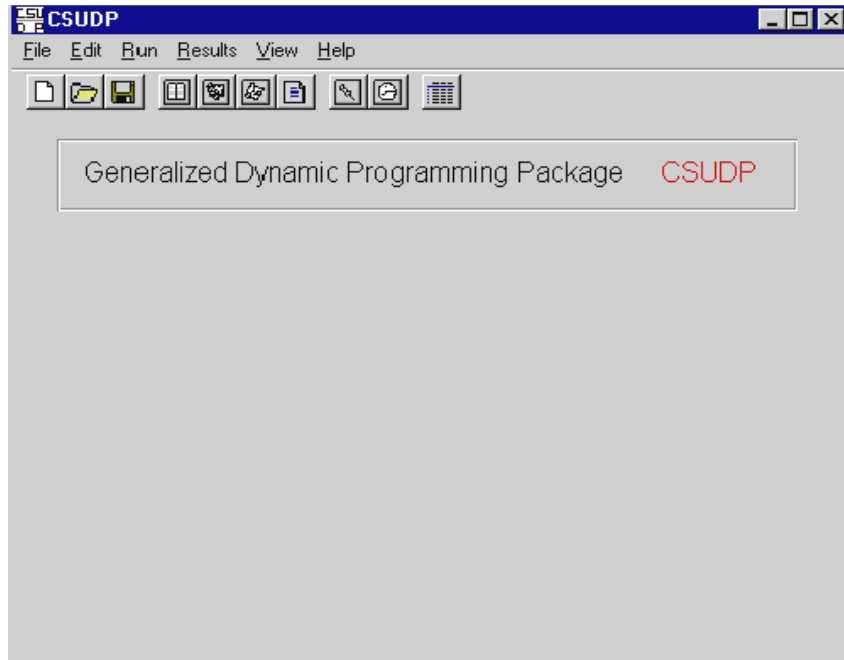
Numerous agencies and organizations employ MODSIM for a wide variety of applications, including:

- 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

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 <http://modsim.engr.colostate.edu/>

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- Triana, E. and **J. Labadie**, "GIS-based Decision Support System for Improved Operations and Efficiency Conservation in Large-scale Irrigation Systems," *Journal of Irrigation and Drainage Engineering* (submitted 2011).
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- Labadie, J.** and Y. Wan, "Fuzzy Optimal Control of Reservoir-assisted Stormwater Treatment Area for Aquatic Ecosystem Remediation," *Environmental Modelling & Software*, 25(12), pp. 1692-1701 (2010).
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- Lee, J-H and **J. Labadie**, "Stochastic Optimization of Multi-reservoir Systems via Reinforcement Learning," *Water Resources Research*, 43, W11408 (2007).
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- Rieker, J. and **J. Labadie**, "GIS Visualization and Analysis of River Operations Impacts on Endangered Species Habitat," *Journal of Water Resources Planning and Management*, ASCE, 132(3), pp. 153-163 (2006).
- 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).
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- Gates, T., J. P. Burkhalter, **J. Labadie**, and J. Valliant, "Monitoring and Modeling Flow and Salt Transport in a Salinity-Threatened Irrigated Valley," *Journal of Irrigation and Drainage Engineering*, ASCE, 128(2), pp. 87-99 (2002)
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- 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).
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