Curriculum Vitae

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Personal

Date of Birth	September 22th, 1975
Place of Birth	Legnano, (MI), Italy
Citizenship	Italian

Education

2005	Ph.D. in Operations Research (University of Calabria).
2001	Laurea degree in Engineering, summa cum laude (University of Calabria)

Current Position

2/10/2006-now	Assistant Professor of Operations Research at the University of Calabria.

Research Fields

Nonlinear integer stochastic programming

Stochastic programming under probabilistic constraints

Health service management

Stochastic Data Envelopment Analysis

Routing problems

Brief comment on specific subject areas

Nonlinear integer stochastic programming

> The main focus of my activity research is on methods able to cope with both integralities and nonlineratities in a stochastic context. A decomposition-based method

for Stochastic Integer Nonlinear Problems was developed during my Ph.D. This is one of the very few existing implementations of a method for solving stochastic mixed integer nonlinear programming based on deterministic global optimization. A novel stochastic formulation for the well known Trim Loss problem was also presented. Development and implementation of a method for solving SMINLPs with integrality restriction in the first stage only is an ongoing work. The application of cutting plane methods- Dantzig Wolf Decomposition for solving the dual of the Stochastic Mixed Integer Problem obtained by relaxing the nonanticipativity constraints is an other line of current research. This can be viewed as an inner linearization of the primal problem: in fact, the master problem may be considered a piecewise linear approximation of the primal. The idea is to combine this approach with a Branch and Bound scheme.

Stochastic programming under probabilistic constraints

An algorithm has been studied for chance constrained models with random technology matrix. A specialized algorithm has been proposed and results have been collected on several instances of the set covering model with random coverage matrix. We are currently working on the more involved case in which probabilistic constraints are involved in a tqo stage framework. Extensions to the nonlinear case are work in progress.

Health service management

The aim of this research line is the definition of decisions support tools for problems arising in health care management. In particular, the attention is devoted to the definition of mathematical models and solution approaches for strategic problems relevant in this area. Several stochastic programming model with probabilistic constraints have been developed to solve both the location and the dimensioning problems of an Emergency medical services in order to achieve a reliable level of service and minimize the overall costs.

A Strategic Planning Model has been developed and validated for the optimal organization of transplant systems.

We focused on the critical role of time in transplantation process as well as on a spatial distribution of transplant centers. Our model differs from previous modeling approaches in that it considers the nationwide reorganization of the transplant system, identifying system barriers that may impair equity and efficiency. An extension of the work has been presented that takes into account the probabilistic nature of the selection of health care facilities. In this context a spatial interaction model has been proposed to account for individual trades off between the benefit of belonging to a crowded waiting list and the costs of a long waiting for transplant.

Optimization models to address decisions regarding the organization of clinical laboratories have been developed and tested on different laboratories. The models involved the study and the definition of critical spatial and organizational relationships to ensure adequate capacity across the entire system.

Stochastic Data Envelopment Analysis

DEA is a nonparametric technique that relies on linear programming to determine the relative efficiency of organizational units (called decision making units or DMUs in DEA terminology). Stochastic DEA is receiving growing attention from the scientific community in that has been shown to often perform at least as well as linear regression and offers the additional advantage of being able to identify sources of inefficiencies. Nevertheless researchers have developed models based on strong and often unrealistic assumption regarding the probability distributions of the random parameters involved in the models. Our main goal is a careful study of the most appropriate way to handle uncertainty.

A novel scenario-based approach which does not make any assumption on the form of the probability distributions has been presented and results have been compared with the standard approach present in the literature.

Routing problems

The aim of this research line is the definition of decisions support tools for problems arising in logistic. In

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particular, the attention is devoted to the definition of solution approaches for relevantproblems in this area. In particular, several metaheuristic strategies have been implemented for the dial a ride problem, both in a deterministic and stochastic setting. A new research stream concerns the development of stochastic variants of some well known routing problems, as the Traveling purchaser problem and the mixed capacitated general routing problems.

Seminars and Presentations

September 2002	AIRO Conference, L'Aquila (Italy)(Contributed talk).
June 2004	Workshop on Large Scale Nonlinear Optimization, Erice (Italy)(Contributed talk).
September 2004	AIRO Conference, Lecce (Italy) (Contributed talk).
July 2005	New Frontiers of High Performance Computing, Cetraro (Italy) (Contributed talk).
July 2005	EURO Summer Institute "OR in Health", Southampton (UK)(Contributed talk).
September 2005	AIRO Conference, Camerino (Italy) (Contributed talk).
April 2006	Regional Course of the Italian Society of Medical Emergencies SIMEU, Altomonte (Italy) (Contributed talk).
May 2006	12th IFAC Symposium on Information Control Problems in Manufacturing, Saint Etienne (France) (Contributed talk).
April 2007	Spring school on stochastic programming: theory and applications, Bergamo (Italy) (Contributed talk).
June 2007	International Workshop on Scheduling, Cetraro (Italy) (Contributed talk).
September 2008	The 20th European Modeling and Simulation Symposium, Campora San Giovanni (Italy) (Contributed talk).
September 2011	AIRO 2011, Settembre 6 - 9, 2011, Brescia, (Italy) (Contributed talk).
June 2012	ICORFE 2013: International Conference on Operations Research and Financial Engineering, Paris (Contributed

talk).

September 2012	Conferenza AIRO, Vietri (Italy)(Contributed talk).
January 2013	Conferenza AIRO Winter, Champoluc (Italy)(Contributed talk).
July 2013	EURO Conference, Roma (Italy) (Contributed talk).
July 2013	International Conference on Stochastic Programming 2013, Bergamo (Invited talk).
July 2014	IFORS Conference, Barcellona (Spain).(Invited talk)
January 2015	AiroWinter Conference, Champoluc (Italy). (Invited talk)
June 2015	17th British-French-German Conference on Optimization, London. (Contributed talk)
June 2016	Modelling Uncertainty in healthcare: research problems and challenges. Developing Mathematical Models in Healthcare Seminar, School of Mathematics, Cardiff University. (Invited)
September 2016	Introduction to Stochastic Programming Ph.D. Short course, Leuven Belgium (Erasmus program for Teachers)
September 2016	46th Annual Conference of the Italian Operational Research Society Emerging Advances in Logistics Systems, Trieste (Italy) (Invited talk)

Workshops and Conferences

December 2004	Coping with Uncertainty Workshop, December 13 - 16, 2004, IIASA Laxenburg.
July 2005	31 meeting of the Euro working group Operational Research Applied to Health Services, Southampton.
September 2009	AIRO Conference, Siena (Italy).
November 2009	Spring school on stochastic programming: theory and applications, Bergamo.

Awards and Scholarships

1995	Federazione Nazionale dei Cavalieri del Lavoro Scholarship.

1995	Warwick University pre-sessional course. Warwick (UK).
1995	International school of English, Ministry of Education. Malta.
July 2005	EURO Summer Institute "OR in Health" , Southampton (UK).
May 2006	COMBSTRU School on Computational Complexity scholarship. Bertinoro (Italy). Held by Prof, B. Codenotti (CNR PISA) and P. Pudlak (Mathematical Institute of the Academy of Sciences of the Czech Republic).

Short Courses

June 2004	Numerical Methods for Unconstrained optimization. University of Calabria (Held by Mehiddin Al-Baali, Associate Professor Department of Mathematics and Statistics College of science Sultan Qaboos University)
September 2004	Standard Quadratic Optimization Problems: theory, procedures, applications. University of Calabria (Held by Professor Immanuel M. Bomze Statistics and Decision Support Systems Department University of Vienna).
December 2004	Parallel Computing. Centro di Eccellenza per il Calcolo ad Alte Prestazioni-University of Calabria.
March 2005	Solving Large Linear Equations: Theory, Algorithms and Computer Implementation. (Held by Janusz Kowalik University of Washington).

Pubblications

Papers published on international journals with referee

1	P. Beraldi, M.E. Bruni, D. Conforti. Designing Robust Medical Service via Stochastic Programming. **European Journal of Operational Research**, 158 (2004), 183-193.
2	M.E. Bruni, D. Conforti, S. Trotta, N. Sicilia. A new organ transplantation location-allocation policy: The case study of Italy. **Health Care Management Science**, 9 (2006), 125-142.

3   M.E. Bruni. A decomposition-based solution method for stochastic mixed integer nonlinear programs. **4OR A Quarterly Journal of Operations Research**, 4(4) (2006), 343–346.

4   M.E. Bruni, Programmazione Stocastica Nonlineare Intera. **Bollettino della Unione Matematica Italiana Sez. A**, August 2006, 215–219.

5   P. Beraldi, M.E. Bruni. A probabilistic model applied to emergency service vehicle location. **European Journal of Operational Research**, 196(1) (2009) 323–331.

6   P. Beraldi, M.E. Bruni, D. Conforti. The stochastic trimloss problem. **European Journal of Operational Research**, 197 (2009) 42-49.

7   P. Beraldi, M.E. Bruni, F. Guerriero, Network reliability design via joint probabilistic constraints. **IMA Journal on Management Mathematics**, 21(2), (2010) 213–226.

8   M.E. Bruni, P. Beraldi, D. Conforti., A Solution Approach for Two-Stage Stochastic Nonlinear Mixed Integer Programs. **Algorithmic Operations Research**, 4(1) (2009), 76–85.

9   M.E. Bruni, P. Beraldi, D. Conforti, E. Tundis, Probabilistically Constrained Models for Efficiency and Dominance in DEA. **International Journal of Production Economics**, 117, (2009) 219–228.

10   M. E. Bruni, F. Guerriero, E. Pinto, Evaluating project completion time in Project Networks with Discrete Random Activity Durations. **COR**, 36, (2009), 2716–2722.

11   M.E. Bruni, F. Guerriero, An Enhanced Exact Procedure for the absolute robust shortest path problem. International Transactions in Operational Research, (2009), 1-14.

12   P. Beraldi, M.E. Bruni. An Exact Approach for Solving Integer Problems under Probabilistic Constraints with Random Technology Matrix. **Annals of Operations Research**, 177(1), (2010) 127–138.

13   M.E. Bruni, F. Guerriero and V. Patitucci, Benchmarking Sustainable Development via Data envelopment Analysis: an Italian case study. **International journal of Environmental Research**, 5(1), (2011) 47-56.

14   M.E. Bruni, P. Beraldi, F. Guerriero, E. Pinto, A heuristic approach for resource constrained project scheduling with uncertain activity durations. **Computers and Operations Research**, 38(9), (2011) 1305–1318.

15   M.E. Bruni, P. Beraldi, A. Violi Capital Rationing Problems under Uncertainty: A Probabilistically Constrained Approach. **Computational Optimization and Applications**, 51, (2012) 1375–1396.

16   M.E. Bruni, P. Beraldi, F. Guerriero, E. Pinto, A methodology for dealing with uncertainty in construction projects. **Engineering Computations**, 28(8), (2011).

17   M.E. Bruni, F. Guerriero, F. Greco, A hybrid greedy randomized adaptive search heuristic to solve the Dial-a-Ride problem. **Asia-Pacific Journal of Operational Research**, 30, (2013).

18   G. Iazzolino, M.E. Bruni, P. Beraldi, Using DEA and financial ratings for credit risk evaluation: an empirical analysis. **Applied Economics Letters**, 20(14), (2013), 1310–1317.

19   M.E. Bruni, P. Beraldi, Data envelopment analysis under uncertainty and risk. In: World Academy of Science, **Engineering and Technology**, 66, (2012) 837–842.

20   M.E. Bruni, P. Beraldi, G. Iazzolino, Lending decisions under uncertainty: a DEA approach. **International Journal of Production Research**, 52(3), (2014), 766-775.

21   M.E. Bruni, P. Beraldi, An advanced system for portfolio optimization. **International Journal of Grid and Utility Computing** , 5(1), (2014) 21–32.

22   M.E. Bruni, Breast cancer screening: a Stochastic DEA study. **American Journal of Operations Research**, 3(6), (2013) 506–513.

23 M.E. Bruni, P. Beraldi, D. Conforti, A stochastic programming approach for the strategic valve locations problem in a water distribution system. **Procedia - Social and Behavioral Sciences**, (2014) 129–138..

24 P. Beraldi, M.E. Bruni. A Clustering Approach for Scenario Tree Reduction: An Application to a Stochastic Programming Portfolio Optimization Problem. TOP, (2013) 1–16.

25 M.E. Bruni, P. Beraldi, D. Conforti, A stochastic programming approach for operating theatre scheduling under uncertainty. **IMA Journal on Management Mathematics**, (2014), in press.

26 M.E. Bruni, F.Guerriero, P. Beraldi. Designing robust routes for demand-responsive transport systems. **Transportation Research Part E**, 70(1), (2014) 1-16.

27 P. Beraldi, M.E. Bruni, D. Lagana, R. Musmanno. The Mixed Capacitated General Routing Problem under Uncertainty. European Journal of Operational Research, 240(2), (2015) 382-392.

28 P. Beraldi, M.E. Bruni, D. Manerba, R. Mansini. A stochastic programming approach for the traveling purchaser problem. IMA Journal of Management Mathematics. Advance Access 10.1093/imaman/dpv022.

29 S. Khodaparasti, H. R. Maleki, M. E. Bruni , S. Jahedi, P. Beraldi, D. Conforti. Balancing efficiency and equity in location-allocation models with an application to strategic EMS design. Optimization Letters (2015) 1-18.

30 S. Khodaparasti, H. R. Maleki, M. E. Bruni , S. Jahedi, P. Beraldi. Enhancing community based health programs in Iran: a multi-objective location-allocation model. Health Care Manag Sci DOI 10.1007/s10729-016-9366-2

31 M.E. Bruni, P. Beraldi, D. Conforti . Water distribution networks design under uncertainty. TOP (2016). doi:10.1007/s11750-016-0425-0

32 R. Aringhieri, M.E. Bruni, S. Khodaparasti, J.T. van Essen, Emergency medical services and beyond: Addressing

new challenges through a wide literature review. Computers and Operations Research, 78(1), 2017 349-368

33	P. Beraldi ,M.E. Bruni, D. Manerba and R. Mansini, A stochastic programming approach for the traveling purchaser problem. IMA Journal of Management Mathematics, vol. 28, 2017 41-63
34	M.E. Bruni, L. Di Puglia Pugliese, P. Beraldi, F. Guerriero. An adjustable robust optimization model for the resource-constrained project scheduling problem with uncertain activity durations. Omega, in press

Chapters in international books with referee

M.E. Bruni. Solving nonlinear mixed integer stochastic problems: a global perspective. Leo Liberti and Nelson Maculan (eds.), **Global Optimization: From Theory to Implementation**, Kluwer (Nonconvex Optimization and its Applications series), 2006, vol. 84, 75-106.

M.E. Bruni, P. Beraldi, F. Guerriero. The Stochastic Resource-Constrained Project Scheduling Problem. **Handbook on Project Management and Scheduling**, Chapter 44. In press

Papers on national journals with referee

M.E. Bruni, D. Conforti, C. Ieropoli. La Pianificazione ottimale dei Flussi di Lavoro nei Laboratori di Analisi Cliniche, **The Italian Journal of Laboratory Medicine** 2007, 3(3) (2007), 178-188.

Other pubblications

M.E. Bruni. An integrated Chance Constrained-Two-Stage Model for the design of Emergency Medical Services, EURO Summer Institute-ESI XXIII.

Proceedings of conferences with referee

P. Beraldi, M.E. Bruni, D. Conforti, "Designing Robust Emergency Medical Service via Stochastic Programming

under Probabilistic Constraints", in Integrare Ricerca Operativa e Tecnologia dell'Informazione per il Supporto alle Decisioni in Sistemi Reali, pp. 152 - 154, XXXIII Giornate di Lavoro AIRO 2002, L'Aquila, 10 - 13 Settembre 2002.

P. Beraldi, M.E. Bruni, D. Conforti, "A decomposition coordination approach for solving nonlinear mixed integer stochastic programs", in Proceedings of AIRO2004, pp. 61 - 62, XXXV Giornate di Lavoro AIRO 2004, Lecce, Italy, 7 - 10 Settembre 2004.

Bruni M. E. , Conforti D. , " A new organ transplantation location-allocation policy: A case study of Italy". Atti del convegno "AIRO 2005", Camerino, 6-9 September, 2005.

P. Beraldi , M.E. Bruni, F. Guerriero, E. Pinto. Heuristic Procedure for Probabilistic Project Scheduling. In: Proceedings of the 20th European Modeling and Simulation Symposium. The European Modeling and Simulation Symposium. Campora San Giovanni, Amantea (CS), Italy. September 17-19, 2008. (pp. 655-665).

P. Beraldi, M.E. Bruni, D. Conforti. Improving the Efficiency of Clinical Laboratory: a Mathematical Approach, Preprints Volume of the 12th IFAC Symposium on Information Control Problems in Manufacturing, A. Dolgui, G. Morel, C. Pereira (eds), vol. 3 Operational Research, 659-665.

P. Beraldi, M.E. Bruni, D. Conforti, "A Two-Stage Stochastic Model for Planning and Scheduling Operating Rooms under Uncertainty", 6th IMA Int. Conf. on Quantitative Modelling in the Management of Healthcare, London (UK), March 29 - 31, 2010.

D. Conforti, M.E. Bruni, P. Beraldi, "Scheduling Operating Rooms under Uncertainty: a Stochastic Programming Approach", 36th ORAHS - Int. Conf. of the EURO Working Group on Operational Research Applied to Health Services, Genova (Italy), July 18 - 23, 2010.

M.E. Bruni, R. Aringhieri, "A new maximum reliability

model for locating and dispatching ambulances", 36th ORAHS - Int. Conf. of the EURO Working Group on Operational Research Applied to Health Services, Genova (Italy), July 18 - 23, 2010.

M.E. Bruni, P. Beraldi, D. Lagan, "A Mate-Heuristic Approach for Stochastic Integer Problems under Joint Probabilistic Constraints with Random Technology Matrix" in Proceedings of AIRO2011, pp. 148 - 149, Settembre 6 - 9, 2011, Brescia, Italy.

BRUNI M, BERALDI P, MANSINI R, MANERBA d (2012). The traveling purchaser problem under uncertainty. In: Proceeeding of the 43rd Annual Conference of the Italian Operational Research Society Graph Algorithms and Optimization. p. 35-36, Vietri sul Mare (SA)

Bruni M, Beraldi P, Conforti D (2013). Stochastic programming approaches for the design and management of water distribution networks. In: Abstract book of the AIRO Winter 2013 Conference. Champoluc, Val D'Ayas, Aosta , January 28 - February 1, 2013

M.E. Bruni, P. Beraldi, D. Conforti, A Stochastic programming approach for the strategic valve locations problem in a water distribution system, Euro 2013, Luglio 1-4, Roma, Italy.

M.E. Bruni, P. Beraldi, D. Conforti, The Stochastic Mixed Capacitated General Routing Problem: formulation and solution approaches, ICSP 2013, Bergamo Italy.

M.E. Bruni, P. Beraldi,, VOCATURO F, LAGANA' D, MUSMANNO R (2014). THE TRAVELING REPAIRMAN PROBLEM WITH STOCHASTIC PROFITS. In: ABSTRACT BOOK OF THE 20th Conference of the International Federation of Operational Research Societies. BARCELLONA, 13-18 LUGLIO 2014

M.E. Bruni, P. Beraldi, Guerriero F, Di Puglia Pugliese L (2015). The robust resource constrained project scheduling problem. In: (a cura di): 17th British-French-German Conference on Optimization., Book of abstracts-17th British-French-German Conference on Optimiza-

tion. London, 15-17 June

Bruni M, Beraldi P, Khodaparasti S (2016). Optimizing time related performance measures in logistic problems under uncertainty. In: Abstracts Book–46th Annual Conference of the Italian Operational Research Society Emerging Advances in Logistics Systems. Trieste, 6-9, Settembre 2016

Activities   Session chair ICORFE 2013, Paris.

Session chair Stochastic models in production, manufacturing and services. / Stream: Stochastic Models for Service Operations. IFORS 2014, Barcellona.

Session chair Advances in Optimization. 17th British-French-German Conference on Optimization 2015, London.

Teaching experience

2001/2002	University of Calabria (Italy) Teaching Assistant (tutorials and exams) -Ricerca Operativa, Ottimizzazione and Modelli di Sistemi di Servizio.
2003/2004	University of Calabria (Italy) Teaching Assistant (tutorials and exams) -Ottimizzazione.
2004/2005	University of Calabria (Italy) Teaching Assistant (tutorials and exams) - Pianificazione e Gestione dei Servizi.
2004/2005	University of Calabria (Italy) Teacher -Ottimizzazione
2005/2006	University of Calabria (Italy) Teacher -Ricerca Operativa II
2005/2006	University of Calabria (Italy) Teaching Assistant-Ricerca Operativa II
2005/2006	University of Calabria (Italy) Teacher -Modelli per la Gestione dei Progetti
2005/2006	University of Calabria (Italy) Teaching Assistant (tutorials and exams) - Pianificazione e Gestione dei Servizi.
2005/2006	University of Calabria (Italy) Teaching Assistant (tutorials and exams) - Ottimizzazione.

2006/2007	University of Calabria (Italy) Teacher -Ottimizzazione.
2006/2007	University of Calabria - Crotone (Italy)- Teacher -Ottimizzazione.
2007/2008	University of Calabria - Crotone (Italy)- Teacher -Ricerca Operativa.
2008/2009	University of Calabria - (Italy)- Teacher -Ricerca Operativa II.
2009/2010	University of Calabria - (Italy)-Teaching Assistant (tutorials and exams) -Ricerca Operativa.
2009/2010	University of Calabria - (Italy)-Teaching Assistant (tutorials and exams) -Ricerca Operativa.
2010/2011	University of Calabria - (Italy)-Teacher Sistemi di Supporto all'ottimizzazione.
2011/2012	University of Calabria - (Italy)-Teacher Ottimizzazione.
2012/2013	University of Calabria - (Italy)-Teacher Ottimizzazione.
2013/2014	University of Calabria - (Italy)-Teacher Ottimizzazione.
2014/2015	University of Calabria - (Italy)-Teacher Ottimizzazione.
2015/2016	University of Calabria - (Italy)-Teacher Production Process Management.
2014/2015	University of Calabria - (Italy)-Tutor Ricerca Operativa II.
2015/2016	University of Calabria - (Italy)-Teacher Business Process Design, Management and Optimization.
2015/2016	University of Calabria - (Italy)-Teacher Ottimizzazione.

Languages	Italian (native), English, French (scholastic), Spanish (written)

Others qualifications

1995	Annual Course in Economics -Confindustria (28/30)
2000	Short Course "The Evolving Competitive Electricity Marketplace"- Politecnico di Milano.

2002	Master Degree in Health care management science, University La Sapienza, Rome (Italy)

Partecipation to research projects

European project	STREP HEARTFAID IST-2005-027107 A Knowledge Based Platform Of Services For Supporting Medical-Clinical Management Of Heart Failure Within Elderly Population
PRIN	2007 Ottimizzazione di sistemi dinamici stocastici con applicazioni alla finanza
PON	ICT-sud
PON	HealthSoaf
PON	PON01-01286 eJRM (Electronic Justice Relationship Management
PON	PON01-00990 AUTOMOTIVE ENTERPRISE
PON	PON KOM4TME :KNOWLEDGE MANAGEMENT and INFOTELEMATIC MOBILITY
PON	M2M " Mobile to Mobility: Sistemi informativi e di telecomunicazione per la sicurezza stradale"
PON	NEUROSTAR- NEUROscienze e Sistemi, Tecnologie e procedure Avanzate per diagnosi/prognosi precoci e Recupero/contenimento del danno funzionale in soggetti con gravi disabilita' da patologie acquisite del sistema nervoso centrale.

LaTeX /Arcavacata, 24. Novemeber 2011