

# Iztok Hozo – Brief Curriculum Vitae

## Academic Record and Experience:

1994 - present **Indiana University Northwest** Gary, IN  
**Professor of Mathematics**

- Chair of the Department of Mathematics and Actuarial Science
- Came to Indiana University NW in 1994.  
Promoted to Associate Professor with tenure in 1998.  
Promoted to Professor in 2003.
- Recipient of 2003 President's Award for Teaching Excellence (Indiana University system-wide award – 5000 full-time faculty).
- Recipient of University Research Award 2006
- Recipient of College of Arts and Sciences Research Award in 2006.
- Recipient of 2001 and 2003 Teaching Excellence Recognition Award for Indiana University Northwest
- Selected into the 2000 Faculty Colloquium on Excellence in Teaching (FACET), a highly selective group of outstanding teachers throughout Indiana University.
- 1998 and 1999 Teaching Excellence Recognition Award for Indiana University Northwest.
- Recipient of the 1997 IUN Founders' Day Teaching Excellence Award (Outstanding Teaching Award).
- Member of the Indiana University Graduate Faculty with full status.  
This represents endorsement of my research record and encouragement to teach graduate level courses.
- The Editorial Board of the 2013 IMIA Yearbook of Medical Informatics has selected my article entitled: “*Dual processing model of medical decision-making*”, BMC Med Inform Decis Mak 2012;12 (94):239-47 for listing in the Yearbook as one of the best articles from the literature in medical informatics published in the past year.  
The Yearbook has appeared in August 2013 and is made available to over 20,000 members of the healthcare and biomedical scientific communities through both a print version and online access. It reaches members in more than 40 societies participating to IMIA worldwide.
- Current Research: Writing a series of papers in the area of medical decision-making in collaboration with medical researchers at the University of South Florida. The following topics are of current interest:
  1. Mathematical modeling in medical decision making; designing easy to use tools for medical doctors that enable them to analyze the influence of various parameters on their decisions in various models. Using Excel (with extensive use of VBA macros), Stata (calling procedures in R or Winbugs when necessary) or various other software packages to create easy to use modules that help understand the processes we are researching.
  2. Developing methods for assessing medical innovations; Meta-Analysis of clinical trials; Calculation of life expectancy from AUC (area-under-curve) of published survival curves. Extraction of summary therapeutic parameters from multiple reports on clinical trials. We published the most comprehensive analysis about treatment success in clinical medicine (cancer) showing that discoveries of new treatments are linked to the ethical principle of “equipoise”/“uncertainty principle” (which at the same time defines limits of discoverability in clinical research and drives therapeutic advances in clinical medicine). The work has been described as “the law of clinical discoveries” and has received attention of the press all over

the world with requests for many interviews for our project leader, Dr. Djulbegovic. The paper “When should potentially false research findings be considered acceptable?” selected as the Press Release by the PLoS Medicine & featured in Scientific American.

3. Benefit/risk hypothesis testing model and gamma statistical error. Developing statistical hypothesis testing to account for uncertainties in the benefit/risk decision model, we have developed over the last several years.
  4. Acceptable Regret Theory, developing a Decision theory – based model for incorporating acceptable regret in medical decision making. The paper “Acceptable regret: an extension of basic decision-making concept to medical and clinical research arena” was selected for special presentation at the Society for Judgment and Decision Making in the NSF supported Symposium on “Application and Innovation: Lessons from Medical Decision-Making”, November 14-17, Chicago, 2008
  5. Methods of estimating statistical measures of dispersion from limited data reported in order to perform meta-analysis of clinical trials.
  6. Comparison of simple EBM-DA model ("our" model) with more complex model (e.g. Markov model) in deciding on the threshold for decision making.
  7. Calculation of optimal timing of BMT (bone-marrow transplant).
- 2013 – 2014: **Co-PI** (with Dr. Dipika Gupta, Indiana University School of Medicine – Northwest, for the project “Genetic Link of peptidoglycan recognition proteins with inflammatory bowel disease”. Supported by Indiana University Collaborative research Grants (\$67, 000).
  - Participated as a **consultant/research specialist** in the following grant projects (below). I usually help develop mathematical model for the project, provide theoretical foundation and write software routines (using Access, Maple, Mathematica, Excel, Stata, or another database/ statistical/ mathematical software package) to run simulations and calculations for the project. In most of these projects the lead Principal Investigator was Dr. B. Djulbegovic, my collaborator from University of South Florida. Several grants (some in progress) are with Dr. Dipika Gupta, from Indiana University School of Medicine – Northwest.
    1. 2009 – 2014: “**Development of Evidence-Based Clinical Decision Support System to Aid Prognostication in Terminally Ill Patients**”, \$4,295,000. USAMRMC NO: W81XWH-09-2-0175. Purpose: to develop computer decision-support system for better prognostication in life expectancy and improvement in decision making in terminally ill patients.
    2. 2013-2014: “**Genetic link of peptidoglycan proteins with inflammatory bowel disease**”, \$ 67,000. Indiana University Collaborative Research Grant. With Dr. Gupta (Indiana University School of Medicine); Purpose: Provide funds for research assistant and lab equipment in order to continue our successful (published) research.
    3. 2008 – 2013: “**Myeloma Health Outcome Database**”, 99,000/yr. Millennium Pharmaceuticals, Purpose: To update and create a new web-based searchable health outcome database of randomized trials in multiple myeloma.
    4. 2010 – 2013: “**When are clinical trials ethical for both future patients and study patients**”, \$ 595,410. Bankhead-Coley Cancer Res Program (Florida) Purpose: to identify those situations where the line between research and practice is less blurred, which in turn will help with design, enrollment and funding decisions of clinical trials.
    5. 2009 – 2011: “**Treatment Success and the Ethical Principle of Equipoise**”, \$631,183. NIH/NCI, 1R01CA140408-01. Purpose: the purpose of this grant is to assess if the efficiency and patterns of clinical therapeutic discoveries reflect the ethical principle of equipoise.
    6. 2007 – 2010: “**Quality of Research on Treatment Harms in Cancer**”, \$175,000/yr. NIH/NCI 1R01 NRO10328-01. Purpose: The purpose of this proposal is to perform in-depth critical appraisal treatment-related toxicities in randomized trials sponsored by the NIH/NCI.
    7. 2005 – 2007: “**Evaluation of the quality of clinical trials**”, \$175,000, 1 R01 NS052956-01, NIH/ORI. Purpose: to assess the quality of design, conduct and analysis of cancer randomized trials.

8. 2002 – 2005: "**Equipose and the research integrity of clinical trials**", \$200,000, 1 R01 NS044417-01, NIH/ORI. Purpose: This proposal focuses on the understanding of equipose, which is the fundamental principle on which nearly the entire system of human experimentation stands and its relation to the results of clinical trials.
  9. 2002 – 2005: "**Blood vs. bone marrow stem transplant**", \$ 200,000, 1R01HL71650-01; NIH/NHLBI. Purpose: to perform individual-patient data meta-analysis to assess the role of allogeneic peripheral blood stem cell transplant vs. bone-marrow in patients with hematological malignancies.
  10. 2001 – 2002: "**Myeloma health outcome database of randomized controlled trials**", \$67,000. Millennium (agreement No: 201098). Purpose: To create a searchable health outcome database of randomized trials in multiple myeloma
- Mini-Course: Invited to organize a mini-course describing my research methods by the European School of Oncology with a group of international researchers held in July of 2004 in Antwerp, Belgium.
  - Co-wrote the Solution Manuals for the 8<sup>th</sup> edition of the "Finite Mathematics" and 7<sup>th</sup> edition of the "Mathematics" by Mizrahi-Sullivan published by Wiley and Sons. Participated in extensive revisions of several subsequent editions of both books (mid 2000's).
  - Curriculum Development: Developed two new Bachelor of Science in Mathematics programs at Indiana University Northwest.
  - Developing new courses, for example *Mathematics and Politics* (supported by the IU-NSF grant "Mathematics Throughout the Curriculum" – presented a talk at the Joint AMS-MAA conference in New Orleans) and *Mathematics in the Workplace* course designed for the Swingshift College (students working in shifts in local steel mills and attending our university).
  - Co-designer of a project transforming our developmental mathematics classes into technology-based, modular courses (which was unsuccessful due to logistical difficulties)..
  - Director of a pre-calculus/calculus reform project "*Calculators for Commuters*" at the Indiana University Northwest incorporating technology into curriculum. The project was funded by the Strategic Directions Initiative of Indiana University (\$20,000), and enabled us to set up a bank of about 100 calculators (TI-83 graphing calculators) for our students to lease on semester-by-semester basis.
  - Led Gary Youth Gifted and Talented Program for talented 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> grade students from Gary Public School Corporation on and off for several years. The four-week long workshop includes untraditional topics from mathematics curriculum such as topology (Shape of Space), graph theory (Four color theorem), logic and problems solving techniques.
  - Teaching various junior- and senior-level courses (probability, statistics, numerical methods, and operations research, abstract algebra, real analysis, measure theory and topology), as well as several freshman and sophomore courses (intermediate and college algebra, pre-calculus, finite mathematics, calculus I, calculus II, and calculus III).
  - Member of various Committees on Campus, within the department, division, and university-wide. I often serve on some of the following committees:  
Executive Committee - committee elected by Faculty Organization;  
Faculty Board of Review – elected committee;  
Salary Committee – elected committee;  
Campus Promotion and Tenure Committee – elected committee;  
Arts and Science Promotion and Tenure Committee – elected committee;  
IUN Council – campus wide committee consisting of all constituencies deciding on strategic directions and advising senior administration on day-to-day operations of the campus (meets monthly).  
Grants and Research Committee – awards time-releases, fellowships, and grant-in-aid proposals;  
Arts and Science Curriculum Committee – work-intensive committee dealing with curriculum issues and new programs.  
Budgetary Affairs Committee – a committee dealing with the always-diminishing budget of the university.  
Some of the other committees I served on in the past several years at IUN: Computer Committee,

Teaching Committee, Faculty Affairs Committee, Academic Affairs, Scholarship Committee ...

- P-16 committee – appointed to a committee with membership that includes faculty, administrators from IU, as well as superintendents from public school systems in Indiana, which is trying to improve the integration of educational experience for students from Preschool to Higher Education.
- Summer Faculty Research Fellowships at IUN, summers of 1995, 1997, 2002, 2004, 2006.

**1988 – 1993      University of Michigan      Ann Arbor, MI**

**Lecturer, Research Assistant and Teaching Assistant**

- Ph. D. in Mathematics (1993).
- Participated in the Calculus Reform program at the University of Michigan in 1993-1994.
- Rackham Predoctoral Fellowship (1992-1993).
- N.S.F. support (summers 1990-1992). Research Assistant (1991 and 1992).

**1983 – 1988      University of Sarajevo      Sarajevo, Bosnia**

- B. S. in Mathematics (1988).
- Research in Measure Theory and Real Analysis.
- Hasan Brkic Golden Medal of University of Sarajevo for Outstanding Performance;

**1987 – 1988      IRIS Research Institute      Sarajevo, Bosnia**

- Developed software in programming languages DBase IV and C for IRIS, (summers 1987 and 1988).

**Professional Societies**

- I usually belong to at least one of the professional organizations in the field: **Mathematical Association of America** or **American Mathematical Society**, or in the profession: **American Association of University Professors**.

**Refereed Publications:**

- 1) **Hozo I** and H.I. Miller, ``On Riemann's Theorem About Conditionally Convergent Series'', *Matematicki Vesnik*, (1986), **38**: 279-283.
- 2) **Hozo I**, ``The eigenvalues of the Laplacian of the homology of the Lie algebra corresponding to a poset'', [Electronic Journal of Combinatorics](#), Vol. 2 (1995) #R14 (42 pages).
- 3) B.Djulgovic, **Hozo I**, I. Abdomerovic, S. Pudar-Hozo, ``Diagnostic Entropy as a function of therapeutic benefit/risk ratio'', *Medical Hypothesis* (1995) **45**: 503-509.
- 4) **Hozo I**, ``Inclusion of the poset homology into the Lie algebra homology'', [Journal of Pure and Applied Algebra](#), (1996) **111**: 169-180.
- 5) **Hozo I**, B. Djulgovic, "Calculating confidence intervals for threshold and posttest probabilities", [M.D. Computing](#). (1998); **15**:110-115
- 6) Djulgovic B, **Hozo I**, Fields K, Sullivan D. "High Dose Chemotherapy in the Adjuvant Treatment of Breast Cancer: Benefit/Risk Analysis." [Cancer Control](#). (1998); **5**:26-37
- 7) Djulgovic B and **Hozo I**. "Acting on evidence can only be done within the context of decision analysis." *BMJ* (1998); July 29 (<http://www.bmj.com/cgi/eletters/317/7151/139>)
- 8) **Hozo I**, B. Djulgovic, "Computer program for the Diagnosis and Treatment of Polycythemia Rubra Vera", [M.D. Computing](#). (1999); **16**:83-89
- 9) Djulgovic B, **Hozo I**, McMasters K, Schwartz A. "Regret in Medical Decision Making " *Med Hypotheses* (1999); **53**:253-259.

- 10) **Hozo I**, Djulbegovic B. "Using Internet to Calculate Clinical Action Thresholds " *Comp Biomed Res* (1999); **32**:168-185.
- 11) Djulbegovic B, **Hozo I**, Lyman GH. "Talking about treatment". *Ann Intern Med* (2000); **132**: 93-94.
- 12) Djulbegovic B, **Hozo I** and Lyman G. "Linking Evidence-based Medicine Therapeutic Summary Measures to Clinical Decision Analysis". *MedGenMed*, January 13, (2000) (≈20 pages)
- 13) Djulbegovic B, Adams J, Lyman G, Lacevic M, **Hozo I**, Greenwich M, and Bennett C. "Evaluation and Appraisal of Randomized Controlled Trials in Myeloma" *Annals Oncol* (2001); **12**: 1-7
- 14) Djulbegovic B, **Hozo I**. "At what degree of belief in research hypothesis a trial in humans is justified?", *Journal of Evaluation in Clinical Practice* (2002); **8**(2), 269-276.
- 15) Soares HP, Kumar A, Daniels S, Swann S, Cantor A, **Hozo I**, Clark M, Serdarevic F, Gwede C, Trotti A, Djulbegovic B "Evaluation of New Treatments in Radiation Oncology: Are They Better Than Standard Treatments?" *JAMA (Journal of the American Medical Association)* 293.8 (2005) 970-78.  
The same issue of JAMA also contained an editorial addressing our article titled "The Case for Randomized Trials in Cancer Treatment. New Is Not Always Better" by A. Grann and V. Grann.
- 16) Pudar Hozo S, Djulbegovic B, **Hozo I**, "Estimating the mean and variance from the median, range, and the size of a sample." *BMC Medical Research Methodology* 5:13 (2005)
- 17) **Stem Cell Trialists Group**<sup>1</sup>. "Allogeneic Peripheral Blood Stem Cell Transplant vs. Bone Marrow Transplant in the Management of Hematological Malignancies:" An Individual Patient Data Meta-Analysis of 9 Randomized Trials. *Journal of Clinical Oncology*. 23.22 (2005): 5074-87;
- 18) **Hozo I**, Djulbegovic B, Clark O and Lyman G, "Use of re-randomized data in meta-analysis" *BMC Medical Research Methodology* 5:17 (2005)
- 19) Kumar A, Soares PH, Wells R, Clarke M, **Hozo I**, Bleyer A, Reaman G, Chalmers I, and Djulbegovic B, "What is the probability that a new treatment for cancer in children will be superior to an established treatment? An observational study of randomised controlled trials conducted by the Children's Oncology Group.", *British Medical Journal* (2005) ; 331; 1295.  
BMJ, doi:10.1136/bmj.38628.561123.7C (published 18 November 2005).  
The same issue of British Medical Journal also contained an editorial addressing our article titled: "In praise of uncertainty" by F. Godlee.
- 20) **Stem Cell Trialists Group**<sup>1</sup>. "Individual patient data meta-analysis of allogeneic peripheral blood stem cell transplant vs. bone marrow transplant in the management of hematological malignancies: indirect assessment of the effect of day 11 methotrexate administration." *Bone Marrow Transplant* (2006); 38:539-546.
- 21) Djulbegovic B, **Hozo I**. "When should potentially false research findings be considered acceptable?", *PLoS Med.* (2007) Feb;4(2):e26.
- 22) Djulbegovic B, **Hozo I**, Lyman GH, "Estimating net benefits and harms of screening mammography in women age 40-49", *Annals Of Internal Medicine* [*Ann Intern Med*], ISSN: 1539-3704, (2007) Dec 18; Vol. 147 (12), pp. 882.
- 23) Djulbegovic B, Kumar A, Soares HP, **Hozo I**, Bepler G, Clarke M, Bennett CL, "Treatment Success in Cancer. [New Cancer Treatment Successes Identified in Phase III randomized controlled trials conducted by the National Cancer Institute -sponsored Cooperative Oncology Groups: 1955-2000]", *Archives Of Internal Medicine* [*Arch Intern Med*], ISSN: 0003-9926, (2008) Mar 24; Vol. 168 (6),

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<sup>1</sup> I am a member of this group.

pp. 632-42.

- 24) Djulbegovic B, Kumar A, Bepler G, Clarke M, Soares HP, **Hozo I**, Bennett CL. Treatment success in cancer-reply. *Arch Intern Med* (2008);168:2173-2174
- 25) **Hozo I**, Djulbegovic B, "When is diagnostic testing inappropriate or irrational? Acceptable regret approach", *Med Decis Making* (2008);28:540-553.
- 26) **Hozo I**, Schell MJ, Djulbegovic B. "Decision-making when data and inferences are not conclusive: risk-benefit and acceptable regret approach." *Semin Hematol* (2008);45:50-159
- 27) **Hozo I**, Djulbegovic B, "Will insistence on practicing medicine according to expected utility theory lead to an increase in diagnostic testing? Reply to Dekay's commentary : Physicians' anticipated regret and diagnostic testing.", *Med Decis Making* (2009);29:320-324.
- 28) Kumar A, List A, **Hozo I**, Komrokji R, Djulbegovic B, "Decitabine versus 5-azacitidine for the treatment of myelodysplastic syndrome: adjusted indirect meta-analysis", *Haematologica* (2009); 94: doi: 10.3324/haematol.2009.017764
- 29) Herold CI, Djulbegovic B, **Hozo I**, Lyman GH, "Reliable data on 5- and 10-year survival provide accurate estimates of 15-year survival in estrogen receptor-positive early-stage breast cancer." *Breast Cancer Res Treat.* (2010) Volume 121, Number 3, 771-776, DOI: 10.1007/s10549-009-0564-1
- 30) Tsalatsanis A, **Hozo I**, Vickers A and Djulbegovic B, "A regret theory approach to decision curve analysis: A novel method for eliciting decision makers' preferences and decision-making", *BMC Medical Informatics and Decision Making* (2010), 10:51doi:10.1186/1472-6947-10-51
- 31) Djulbegovic B, **Hozo I**, at all. "Optimism bias leads to inconclusive results - an empirical study", *J Clin Epidemiol* (2011) Jun, 64:583-93
- 32) Miladinovic B, Kumar A, **Hozo I** and Djulbegovic B, "Instrumental variable meta-analysis of individual patient data: application to adjust for treatment non-compliance" *BMC Medical Research Methodology* (2011), 11:55.
- 33) Tsalatsanis A, Barnes L, **Hozo I**, Skvoretz J, Djulbegovic B, "A social network analysis of treatment discoveries in cancer", *PLoS ONE* (2011) 6(3): e18060., doi:10.1371/journal.pone.0018060.
- 34) Kumar A, **Hozo I**, Wheatley K, Djulbegovic B, "Thalidomide versus bortezomib based regimens as first-line therapy for patients with multiple myeloma: a systematic review.", *Am J Hematol* (2011) Jan, 86:18-24
- 35) Djulbegovic B, **Hozo I**, Greenland S, "Uncertainty in Clinical Medicine", *Encyclopedia of Medical Philosophy*;2, edited by Gifford F, Elsevier (2011). In: Dov M. Gabbay and John Woods, editors, *Handbook of The Philosophy of Science: Philosophy of Medicine*. San Diego: North Holland, (2011), pp. 299-356.
- 36) Athanasios Tsalatsanis, Laura E Barnes, **Iztok Hozo** and Benjamin Djulbegovic, "Extensions to Regret-based Decision Curve Analysis: An application to hospice referral for terminal patients", *BMC Medical Informatics and Decision Making* (2011), 11:77
- 37) Djulbegovic B, **Hozo I**. "When is it rational to participate in a clinical trial? a game theory approach incorporating trust, regret and guilt", *BMC Medical Research Methodology* (2012), 12:85
- 38) Djulbegovic B, **Hozo I**, Beckstead J Tsalatsanis A, Pauker GS. "Dual processing model of medical decision-making", *BMC Medical Informatics and Decision Making*. (2012), 12:94

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<sup>2</sup> This is a book chapter!



- 39) Miladinovic B, **Hozo I**, B Djulbegovic. "Trial sequential boundaries for cumulative meta-analysis." *The Stata Journal*, 2013; 13(1), pp 1-15.
- 40) Miladinovic B, Kumar A, Mhaskar R, Georgiev H, **Hozo I**, Djulbegovic B. "Optimal information size in trial sequential analysis of time-to-event outcomes reveals potentially inconclusive results due to the risk of random error", *J Clin Epidemiol.* (2013) Jun;66(6):654-9.
- 41) Miladinovic B, Kumar A, **Hozo I**, Djulbegovic B. "Trial sequential analysis may be insufficient to draw firm conclusions regarding statistically significant treatment differences using observed intervention effects: A case study of meta-analyses of multiple myeloma trials." *Contemporary Clinical Trials* 34 (2013) 257–261
- 42) Djulbegovic B, Kumar A, Miladinovic B, Reljic T, Galeb S, Mhaskar A, Mhaskar R, **Hozo I**, Tu D, Stanton HA, Booth CM, Meyer RM. "Treatment Success in Cancer: Industry versus Publicly Sponsored Randomized Controlled Trials - A Systematic Review", *PLoS One.* (2013);8(3):e58711. doi: 10.1371/journal.pone.0058711. Epub 2013 Mar 21.
- 43) Zulfiqar F, **Hozo I**, Rangarajan S, Mariuzza R.A., Dziarski R, Gupta D. "Genetic association of peptidoglycan recognition protein variants with inflammatory bowel disease", *PLoS One.* (2013) Jun 19;8(6):e67393.
- 44) Miladinovic B, Kumar A, **Hozo I**, Djulbegovic B. "Practical methods for incorporating instrumental variable analysis to adjust for treatment contamination in randomized controlled trials and meta-analyses", submitted
- 45) John P.A. Ioannidis, **Iztok Hozo**, Benjamin Djulbegovic, "Optimizing type I and II error pairs for research inferences", *J Clin Epidemiol.* (2013) Aug;66(8):903-910.
- 46) Djulbegovic M, Miladinovic B, **Hozo I**, Djulbegovic B, Dahm P. "Comparative efficacy analysis of intravesical adjuvant therapy for non-muscle invasive bladder cancers" in preparation.
- 47) Zulfiqar F, **Hozo I**, Bowcock A., Dziarski R, Gupta D. "Genetic association of peptidoglycan recognition protein variants with psoriasis", submitted
- 48) Djulbegovic B, Beckstead J, Elqayam S, Reljic T, **Hozo I**, Kumar A, Cannon-Bowers J, Taylor S, Tsalatsanis A, Turner B, Paidas C, "Evaluation of physicians' cognitive styles", submitted
- 49) Ioannidis J, **Hozo I**, Djulbegovic B, "Improving the drug development process: more not less randomized trials", submitted