

**BIOGRAPHICAL SKETCH**

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NAME: Grazyna Badowski

POSITION TITLE: Associate Professor of Mathematics, University of Guam

eRA COMMONS USER NAME (credential, e.g., agency login): GBADOWSKI

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Wayne State University	B.A.	1996—1998	Mathematics
Wayne State University	M.S.	1996—1998	Statistics
Wayne State University	Ph.D.	1998—2001	Mathematics

**A. Personal Statement**

The goal of the Biostatistics Core is to support the U54 Partnership's research efforts in all aspects of study design, data management and analysis. Since 2009, I have been the Co-Leader of the Biostatistics Core of the U54 Partnership. I provide support for the U54-funded research projects on design issues, choice of study populations and sample size, and I am also involved with the data management and analysis, i.e. creating data bases for the projects, data entry and cleaning, selecting appropriate estimates, tests, and models, performing complex analysis and statistical programming. For example, for the BENUT project (Pilot Project I), we developed the data entry system in SPSS, entered the data and assisted in the analysis of clustering of betel nut chewing characteristics and in associations with oral health and obesity, as well as preparation of manuscripts.

As a Co-Leader of Biostatistic Core, I provide statistical support for UOG graduate students supported by U54 grant, and have I mentored research assistants who have completed their undergraduate Mathematics degrees at UOG. I train research assistants in basic statistical analysis since UOG doesn't offer a statistics degree. All the analysis that we do to support U54 projects require knowledge not covered in standard undergraduate mathematics program. One of the research assistants Yan Dai is currently a PhD candidate at University of Arizona in Mathematics Department; another one, Alisha Yamanaka, is a graduate student at Oregon State University, Public Health Program with Biostatistics Concentration.

I also proposed to use the respondent-driven sampling method (RDS) for recruitment of participants to study of health communication on Guam and HI, which was one of the funded U54 pilot projects. We used RDS and achieved a sample size of 511 in only 21 days. Now we are in the process of analyzing the data and evaluating the performance of RDS by comparing the estimates with true population values from 2010 census data. The research from this project has been presented at many conferences and three manuscripts are in progress. Since the results were promising we decided to use RDS again in another U54 Pilot Project entitled "Health Information-Seeking Patterns Among Pacific Youth (HIPPY)". We successfully recruited 365 participants, Chuukese youth 13-19y, in 34 days. In summary, my current research includes the analysis of epidemiological data from cancer studies, the analysis of the cancer registry data and new sampling methods (Respondent Driven Sampling). I have an expertise in the statistical analysis packages SPSS, Excel, Minitab, SYSTAT, EpilInfo7, and SAS.

1. Paulino YC, Hurwitz E, Warnakulasuriya S, Gatewood R, Pierson K, Tenorio L, Novotny R, Palafox N, Wilkens L, Badowski G. Screening for oral precancerous lesions and potentially malignant disorders among areca (betel) nut chewers in the Mariana Islands. *BMC Oral Health*. 2014;14:151 DOI: 10.1186/1472-6831-14-151. PMID: [PMC4292829](https://pubmed.ncbi.nlm.nih.gov/2492829/).

- Leon Guerrero RT, Badowski G, Yamanaka A, Blas-Laguana M, Bordallo R, et al. University of Hawai'i Cancer Center connection: The vital role of cancer registries in the recruitment of an understudied minority population into a breast cancer study: Breast Cancer Risk Model for the Pacific. *Hawaii J Med Public Health*. 2014 Oct;73(10):335-40. PMID: [PMC4203456](https://pubmed.ncbi.nlm.nih.gov/264203456/).

## **B. Positions and Honors**

### **Positions and Employment**

1996-2001	Research Assistant, Department of Mathematics, Wayne State University, Detroit, MI
2001-2003	Research Fellow, Institute for Systems Research, University of Maryland, College Park, MD
2003-2004	Adjunct Faculty: <ul style="list-style-type: none"><li>• George Washington University, Washington DC</li><li>• American University, Washington DC</li></ul>
2004-2006	Visiting Assistant Professor, American University, Washington DC
2006-2012	Assistant Professor, University of Guam, Mangilao, GU
2012-	Associate Professor, University of Guam, Mangilao, GU
2014-	Chair, Division of Mathematics and Computer Science, University of Guam, Mangilao, GU

### **Honors and Awards**

- Bertram Eisenstadt Award for Outstanding Achievement in the Ph.D. Program, Wayne State University, 2001
- The Andre G. Laurent Award for Outstanding Achievement in the Masters Program, Wayne State University, 1997-1998
- Exceptional Teaching Performance Award, Wayne State University, 1997

### **Other Experience and Professional Membership**

- Guam Comprehensive Cancer Control Coalition
- American Statistical Association
- The Mathematical Association of America
- Reviewed abstracts for Pacific Global Health Conference, HI, 2012
- Reviewed abstracts for Journal of Health Care for the Poor and Underserved (JHCPU), Supplemental Issue on Asian American, Native Hawaiian, and Pacific Islander Health.

## **C. Contribution to Science**

- Before I started working on cancer research, I performed extensive research on the properties of singularly perturbed Markov chains that can be used to model many random phenomena. This work eventually led to my current research in sampling methods used on some of the U54 pilot projects.
  - Badowski G, Yin G. Stability of Hybrid Dynamic Systems Containing Singularly Perturbed Random Processes, *IEEE TAC*, 47: 2021-2032, 2002
  - Yin G, Zhang Q, Badowski G. Nearly Optimal Controls of Discrete-time Dynamic Systems Driven by Singularly Perturbed Markov Chains, *Journal of Optimization Theory and Applications* 16(1):131-166, 2002. DOI: 10.1023/A:1022166304069
  - Yin G, Zhang Q, Badowski G. Singularly Perturbed Markov Chains: Convergence and Aggregation. *J. Mult. Anal.* 2000;72:208-229.
  - Yin G, Zhang Q, Badowski G. Asymptotic Properties of a Singularly Perturbed Markov Chain with Inclusion of Transient States, *Ann. Appl. Probab.* 2000;10:549-572.
- Because of my previous study of perturbed Markov chains, I proposed to use respondent-driven sampling method (RDS) for one of the U54 pilot projects "*Health Information Trends and Needs in Guam: Respondent-Driven Sampling (RDS) Method*". The RDS model was based on Markov chain theory and uses information about social network obtained during the recruitment process to weight the sample. If

certain assumptions are satisfied the method should produce the sample independent from the biases that may have been introduced by the non-random choice of “seeds” from which recruitment began. We conducted a survey on health communication in general population on Guam using the RDS method. We investigated the performance of RDS as a Markov chain by assessing all the assumptions, estimating the transition probabilities for certain demographic characteristics (gender, ethnicity) from the data and comparing theoretical equilibrium distribution with the one obtained from the sample. Our sample achieved equilibrium and was largely representative of the total population by sex, ethnicity, socioeconomic status and geographic location but sample overrepresented young adults age 18-34y and with some post high school education. Current respondent-driven sampling statistical inference methods failed to reduce these biases. The results from this project will lead to further development of the RDS methodology.

- a. Badowski G, Somera L, Lee HR, Cassel K. Assessment of Respondent Driven Sampling Data from Guam Health Communication Survey XIII Latin American Congress of Probability and Mathematical Statistics, September 2014, Cartagena, Colombia
  - b. Badowski G, Somera L, Lee HR, Simsiman B, Yamanaka A. Equilibrium Analysis of Respondent Driven Sampling Data from Guam Health Communication Survey. International Workshop on Applied Probability, June 2014, Antalya, Turkey.
  - c. Simsiman B, Yamanaka A, Badowski G, Somera L, Lee HR. Using the Respondent-Driven Sampling Method to Survey Health Communication on Guam. Annual Research Conference, University of Guam, March 2014, Mangilao, GU
3. Guam and Hawaii’s populations offer a unique opportunity to learn about Americans of Pacific island ancestry and their communication and information-seeking behaviors, experiences, and needs relevant to cancer. National surveys (such as HINTS, Health Information National Trends) often do not include data from this area. In the U54 funded project “*Health Information Trends and Needs in Guam: Respondent-Driven Sampling (RDS) Method*” we researched cultural factors and communication practices that may influence health behaviors related to cancer risk and prevention in this population. This research was presented at NCI’s Health Information National Trends Survey (HINTS) Users Meeting in 2014. Dr. Moser, Program Director of the NCI’s Behavioral Research Program’s (BRP) Science of Research and Technology Branch (SRTB) is very interested in our findings and expressed interest in coming to Guam and starting collaboration with us during his sabbatical leave.
- a. Somera L, Lee, HR, Badowski G, et al. Sources of Health and Cancer Information Patterns. Invited presentation, session proposed by International Cancer Information Services Group, United States; World Cancer Congress, December 2014, Melbourne, Australia. <http://icisg.org/resources/conference-presentations/>
  - b. Somera LP, Badowski G, Lee H, Torres V, Ramos D, Simsiman B, Yamanaka A. Health information data about Pacific Islanders in Guam: Using the respondent-driven sampling (RDS) method as a viable alternative to the random-digit dialing (RDD) method. Health Information National Trends Survey (HINTS) Users Meeting, January 2014, Rockville, MD <http://hints.cancer.gov/2013-users-meeting-materials.aspx>
  - c. Lee, H-R., Somera, L., Badowski, G., et al. Health Information Needs and Trends in the Pacific: Guam and Hawaii. International Cancer Education Conference; Seattle, WA, September, 2013.
4. I have also been able to work on Guam epidemiological data. The Behavioral Risk Factor Surveillance System (BRFSS) was conducted on Guam during 2001-2003, and then annually since 2007. Unfortunately Guam Public Health Department did not have the capacity to analyze this data and make it more available. Together with my research assistants we analyzed the data, presented some findings at conferences and co-authored First Guam BRFSS Report. Together with Guam Cancer Registry, we worked on calculating cumulative incidence rates for breast cancer for two major ethnic groups on Guam: Filipino and Chamorro and comparing them with United States. I also investigated a possible increased cancer mortality risk in the village of Merizo, Guam which had been exposed to Polychlorinated Biphenyl.
- a. Badowski G, Simsiman B, Wilkens L, Novotny R, Leon Guerrero R, Cumulative Incidence Rates of Breast Cancer for Filipinos and Chamorros in Guam and the United States. AACR Annual Meeting, April 2015, Philadelphia, PA
  - b. Badowski G, Uncango A. Association of Smoking with Obesity in General Adult Population on Guam. 30th Behavioral Risk Factor Surveillance System (BRFSS) Conference, March, 2013, Atlanta, GA

- c. Uncangco AA, Badowski G, David AM, Ehler MB, Haddock RL, Paulino YC. *First Guam BRFSS Report 2007-2010*. Guam Department of Public Health and Social Services: Mangilao, GU (2012). [http://dphss.guam.gov/sites/default/files/pdf/Guam%27s\\_First\\_BRFSS\\_Annual\\_Report\\_2007-2010.pdf](http://dphss.guam.gov/sites/default/files/pdf/Guam%27s_First_BRFSS_Annual_Report_2007-2010.pdf)
- d. Haddock RL, Badowski G, Bordallo R. Cancer mortality following polychlorinated biphenyl (PCB) contamination of a Guam village. *Hawaii Med J*. 2011;70 (Suppl 2):40-2. PMID: [PMC3254225](https://pubmed.ncbi.nlm.nih.gov/23254225/).

**Complete List of Published Work in MyBibliography:**

<http://www.ncbi.nlm.nih.gov/sites/myncbi/1x1ZxksZ-ckka/bibliography/47645189/public/?sort=date&direction=ascending>

**D. Research Support**

**Ongoing Research Support**

NIH/NCI 2U54-CA-143728 (Underwood - PI) 09/25/2015 – 08/31/2020

**University of Guam/Cancer Research Center of Hawaii Partnership (2 of 2)**

Project Title: Biostatistics Core

The goal of this project is to provide statistical consultation and support to the projects funded under the U54 grant and to build statistical capacity for research at UOG.

Role: Co-Leader

**Completed Research Support**

NIH/NCI U54-CA-143727 (Underwood - PI) 09/01/2009 - 08/31/2015

**University of Guam/Cancer Research Center of Hawaii Partnership (2 of 2)**

Project Title: Biostatistics Core

The goal of this project is to provide statistical consultation and support to the projects funded under the U54 grant and to build statistical capacity for research at UOG.

Role: Co-Leader

NIH/NCI U54-CA-143727 (Underwood - PI) 09/01/2012 – 08/31/2015

**University of Guam/Cancer Research Center of Hawaii Partnership (2 of 2)**

Project Title: Health Information Trends and Needs in the Pacific: A Test of the Respondent-Driven Sampling Method

The goals of this project are to: 1) collect data on cancer information-seeking behaviors on Guam and HI in order to better inform cancer prevention and control program efforts in Guam; and 2) test the respondent-driven sampling method in terms of its efficacy in generating valid population estimates.

Role: Co-I

NIH/NCI U54-CA-143727 (Underwood - PI) 09/01/2012 – 08/31/2015

**University of Guam/Cancer Research Center of Hawaii Partnership (2 of 2)**

Project Title: Health Information Seeking Patterns among Pacific Youth (HIPPY)

The goals of this project are to: 1) document communication ecology among Micronesian youth in Guam and Hawaii; 2) document basic cancer-relevant knowledge, attitudes and behaviors among Micronesian youth in Guam and Hawaii, and 3) document the process through which Micronesian youth in Guam and Hawaii make health decisions.

Role: Co-I