



# Department of Biomedical Informatics

## 2018 Highlights

### LETTER FROM THE CHAIR

My vision for the department is to be an international hub for students, researchers, and industry partners for discovery, innovation, and application of informatics to advance health. This last year, there has been an increase in energy and engagement around the department. In education, we have two large cohorts of MS students joining our incredible PhD students in a more active learning environment that includes a teaching EMR, many new courses focused on wrangling and analyzing biomedical data, a human systems interaction lab, and hands-on FHIR-enabled app development. Students, faculty and others participate weekly in special interest groups focused on translational bioinformatics, computational and symbolic methods, population & public health informatics, and behavioral & clinical informatics.

We are finding shared interest with industry, and our IABtalks series is consistently bringing in over 100 people from the U but also from neighboring schools and businesses. Look for our Industry Advisory Board to grow a lot this year.

The ReimagineEHR initiative is drawing local and national attention as we develop standards-based decision support applications that are going live at Utah Health and are forming a foundational infrastructure on which to enable the best care for patients here and abroad. This infrastructure has extended our ability to get new research grants, and our new collaboration with the Huntsman Cancer Institute has proven especially fruitful with three new center grants--we are working with their researchers to translate research to practice through integration with the EHR.

Please join us during this exciting time--we want more involvement from our alumni, community, and friends as we seek to apply informatics to improving health!



**Wendy Chapman, PhD**



### GET INVOLVED

- \* Attend a Special Interest Group
- \* Join our Industry Advisory Board
- \* Help mentor a student
- \* Offer a lecture or hands-on activity in a class
- \* Advertise internships and jobs

email us: [bmi-alumni@lists.utah.edu](mailto:bmi-alumni@lists.utah.edu)

# RESEARCH

## STRATEGIC AREAS OF FOCUS

Our strategy is to foster multidisciplinary team-science research programs that capitalize on synergy among all three missions of the University Health Sciences. Two programs have been established: ReimagineEHR (<http://reimagineehr.utah.edu/>) and Translational Informatics (<http://medicine.utah.edu/ccts/bmic/>).

## STRATEGIC PILLARS

- Advance the science of informatics
- Establish multidisciplinary collaborations with other Departments within the University
- Seek tight synergy with clinical operations and DBMI's educational mission

## SECURING GRANT FUNDING

ReimagineEHR: obtained \$4,756,000 in Federal grants, including four center grants:

- 5-year NCI U24 center grant (Del Fiol and Kawamoto, co-PIs; Narus, subcontract PI) to enable population-based clinical decision support to identify patients who meet criteria for familial cancer risk evaluation.
- 5-year U01 NCI grant in collaboration with HCI (Kim Kaphingst, PI; Kawamoto and Del Fiol, co-Is). In a multi-site randomized controlled trial (Utah and NYU), we will compare two EHR-based interventions to identify and manage patients who meet criteria for familial cancer risk evaluation.
- 3-year CMS/Medicaid center grant with Pediatrics (Norlin and Del Fiol, co-PIs) focused on the development of tools and resources for care coordination of children with special healthcare needs.
- PCORI grant in collaboration with the HCI

(David Wetter, PI). Through a randomized controlled trial, the study will assess the effect of CDS interventions for tobacco cessation in federally qualified health centers throughout Utah. Five members of the ReimagineEHR Initiative are co-investigators.



Guilherme Del Fiol, MD, PhD  
Vice-Chair, Research

### Translational Informatics:

reflects a large focus of DBMI over the last 10 years, providing informatics support to clinical translational research and research on translational informatics.

- Important role in the successful University CCTS renewal.
- NIBIB center grant (PRISMS; Facelli and Sward, co-PIs) to enable an architecture that integrates sensor and clinical data to support longitudinal studies on asthma.
- NCATS center grant with Vanderbilt (Paul Harris, PI; LaSalle, site PI; Facelli and Del Fiol, co-Is) - Recruitment Innovation Center (RIC) focused on methods and resources to improve clinical trial recruitment.
- NCATS center grant with Northwestern (Justin Starren, PI; Facelli, site PI) to enable software tools that will allow CTSA sites to integrate patient-reported outcomes tools into EHRs.
- 4-year NHGRI consortium (Eilbeck, subcontract PI) to provide tools and curation to integrate clinical and genomic knowledge for the ClinGen Resource.

Facts  
2014-2018

11  
Research Faculty

56  
Grants & Contracts

6  
Center Grants

500+  
Publications

44  
Publications/faculty

34,000+  
Citations

23  
Mean H-Index

\$23,341,060  
Research Expenditures

# EDUCATION



**Exciting developments are happening with the DBMI education program.**

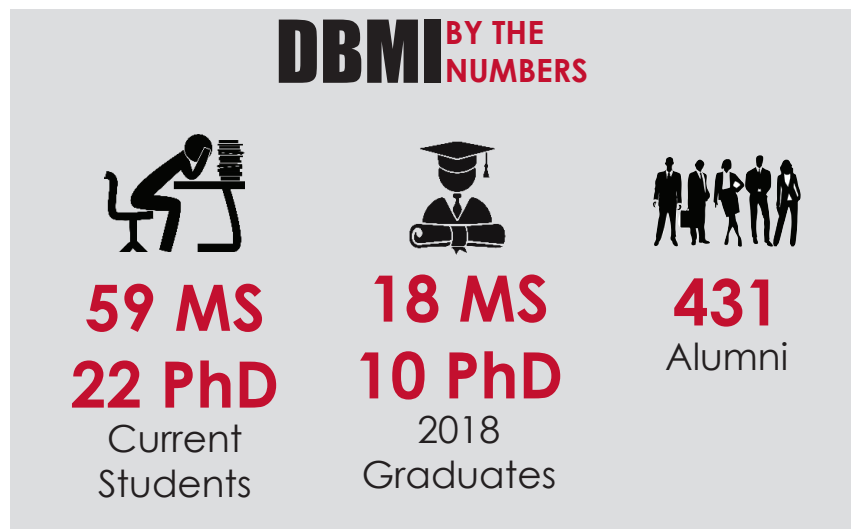
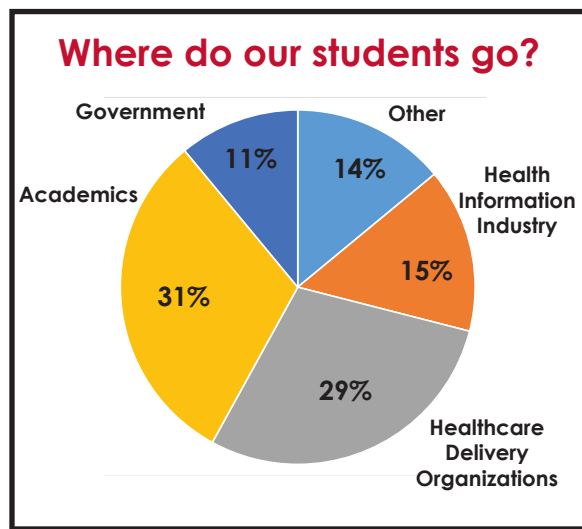
**Lifelong Learning Opportunity** - Drs. Karen Eilbeck and Damian Borbolla are undertaking a year-long certificate program in Educational Scholarship, via the Academy of Health Science Educators.

**We received two supplements to our NLM T15 award:**

- Undergraduate research: We will initiate a summer research program in Biomedical Informatics and Data Science, in collaboration with the Summer Program for Undergraduate Research, the Utah SPUR Program (<https://our.utah.edu/spur/>).
- Bridges to Biomedical Research: We will create bridges to programming, statistics, and machine learning courses from traditional biomedical research disciplines, addressing the national need for a workforce fluent in data science and informatics. We will develop courses and special interest groups with a focus on informatics and data science for graduate students in Human Genetics, Biochemistry, etc.



**Karen Eilbeck, MSc, PhD**  
Vice-Chair, Education



**Launching Fall 2019**  
**Biomedical Informatics MS ONLINE**  
<https://medicine.utah.edu/dbmi/>



# INDUSTRY



## IABtalks

The DBMI Industry Advisory Board (IAB) hosted three successful IABtalks events this past year. The inaugural event was sponsored by Hitek Solutions on February 23, 2018. The theme was natural language processing, with a keynote presentation by DBMI alumnus Gerasimos Petratos, CEO of Hitek. Lightning presentations were given by Mike Dow, Director of Product Development at Health Catalyst, and two of our students, Max Taggart and Jianlin Shi. The May 4, 2018 event on interoperability was sponsored by InterSystems. Dr. Russell Leftwich, Senior Clinical Advisor at InterSystems, gave the keynote presentation. Leah Yingling, Kevin Graves, and Andrew Miller gave the Lightning presentations.

3M Health Information Systems sponsored the October 4, 2018 event with a population health to precision care theme. Dr. Hon Pak, Chief Medical Officer for 3M HIS was the keynote speaker. Student Lightning presentations were given by Michael Watkins, Janette Vazquez, and Jean Fredo Louis.

Attendance for all three events exceeded expectations, with excellent representation from local informatics industry, students and faculty.



We're really excited about the next event scheduled for this spring on April 18, 2019. HealthCatalyst will be the sponsor. Attendees can look forward to a great venue (top floor of the law school building), great food and drink, great speakers, and great networking

opportunities.

## Future of the IAB

Creating a strong and vibrant bond with our industry partners is an essential aspect of preparing our students for their future careers. We see our IAB playing a critical role in creating a strong link between industry and academia. We hope to involve professionals in industry and government who are willing to collaborate and build cooperative relationships and advise our academic program.

We are excited to grow these relationships and take our department to new heights.



# CLINICAL OPERATIONS



Under the leadership of Ken Kawamoto and other faculty members including Guilherme Del Fiol and Charlene Weir, the Department has continued to lead the nation in translating informatics into practice through a strong relationship with IT Operations at University of Utah Health. As a result, the University of Utah has established itself as a national leader in the area of standards-based, EHR-integrated clinical decision-support innovation as a part of its ReimagineEHR initiative. In 2018, University of Utah became the first health system among Epic EHR customers to deploy enterprise decision support using the emerging HL7 CDS Hooks standard, initially focused in the area of opioid clinical decision support.

The University of Utah also developed and deployed multiple EHR-integrated SMART on FHIR applications, including MDCalc clinical calculators, an opioid oral morphine equivalence calculator, an enhanced growth chart application, a diabetes medication effectiveness prediction tool, and a lung cancer screening shared decision-making tool. The University of Utah and its ReimagineEHR initiative has had a strong presence at national venues, including the American Medical Informatics Association annual fall symposium and the

Epic User Group meeting. The ReimagineEHR initiative has high synergy with the Department's research endeavors, enabling over \$25 million in research funding to date.

The Department also continues to have high impact nationally in the area of standards-based interoperability through the efforts of faculty and senior staff including Stan Huff, Guilherme Del Fiol, Ken Kawamoto, Peter Haug, Scott Narus, and Claude Nanjo.

Ken Kawamoto was also elected to the HL7 Board of Directors and is serving as co-chair of the U.S. Interoperability Standards Priorities Task Force of the U.S. Health IT Advisory Committee.



**Kensaku Kawamoto,  
MD PhD, MHS  
Vice-Chair, Clinical  
Operations**

# FACULTY AWARDS AND HONORS



## **WENDY CHAPMAN, PHD**

Dr. Chapman was honored to be one of six faculty members appointed as the inaugural chairholders of a Jon M. Huntsman Presidential Endowed Chair beginning on July 1, 2018. Dr. Chapman has been asked by Francis Collins to serve on the NIH Advisory Committee to the Director. This position will provide advice on matters pertinent to National Institutes of Health mission responsibilities in the conduct and support of biomedical research, medical science, and biomedical communications.

## **BRUCE BRAY, MD**

Dr. Bray has been elected as a fellow to FAMIA. This program recognizes members who apply informatics skills and knowledge within their professional setting, who have demonstrated professional achievement and leadership, and who have a sustained commitment to the betterment of AMIA.



## **KAREN EILBECK, MSC, PHD**

A first for BMI faculty, Eilbeck has been selected to be the School of Medicine Core Educator. She is the new Host & Defense course co-director for medical student education. This fall she was selected by the Office of Health Equity and Inclusion, and the Women in Health, Medicine & Science Program for a travel scholarship to attend the AAMC Mid-Career Women Faculty Seminar.

## **RAMKIRAN GOURIPEDDI, MS, MBBS**

Dr. Gouripeddi received the Reed M. Gardner Award for Faculty Excellence. This award was created by students to acknowledge the achievements of faculty members in the areas of teaching, mentoring, and service to the department.



## **JOHN HURDLE, MD, PHD**

Dr. Hurdle has been awarded a Fulbright Fellowship. It is one of the most widely recognized and prestigious international exchange programs in the world that grants support for graduate study and research in 140 countries. He will be teaching informatics and NLP in Vietnam for five months beginning in January 2019. The program actively seeks out individuals of achievement and potential who represent the full diversity of their respective societies and selects nominees through open, merit-based competitions."

## **KEN KAWAMOTO, PHD**

Dr. Kawamoto, associate Chief Medical Information Officer, was elected to serve on the HL7 Board. He has also been appointed to a 3-year term on the U.S. Health Information Technology (HIT) Advisory Committee.



## **CATHERINE STAES, BSN, MPH, PHD**

Dr. Staes has been elected as a fellow to the American College of Medical Informatics. She has also been appointed as the Nursing Informatics Director.



# STUDENT SCHOLARSHIPS & AWARDS

## RICHARD A. FAY & CAROL M. FAY FELLOWSHIP

The Richard A. Fay and Carol M. Fay Endowed Graduate Fellowship was established by Mr. and Mrs. Richard A. Fay in memory of Homer Warner, MD, PhD. The expendable funds are to be administered by the department chair, and are designated to support graduate students' training, and this year, we were able to provide five fellowships. The recipients are:



J. Fredo Louis



Andrew Miller



Diane Walker



Rosalie Waller



Michael Watkins

## HELMUTH F. ORTHNER TRAVEL ASSISTANCE SCHOLARSHIP

The purpose of this scholarship is to provide travel assistance for international Biomedical Informatics students to attend a scholarly meeting and present their research. This year's recipients are:



Jianlin Shi



Siru Liu

## ROLLAND H. REITER SCHOLARSHIP



Luz Gabriela  
Iorg

Luz Gabriela Iorg received the \$5,000 Rolland H. Reiter Scholarship. The scholarship is awarded to a student chosen based on their interest and contributions to clinical application of biomedical informatics with an emphasis in enhancing quality and/or reducing waste in medicine. Applicants must be a MS candidate in good standing in the department. Applicants must be working full-time in health informatics at a hospital, a health care system, or a private software or service company related to health care informatics.

## JOHN D. MORGAN AWARD

The John D. Morgan Award is a \$5,000 cash award presented each year to an outstanding PhD student in the Department of Biomedical Informatics. The student must be a PhD candidate who has passed the qualifying exam. The award was presented to Rosalie Waller this year. Rosalie has shown exceptional progress in scholarly publications and service to the department. She also received the prestigious NIH F99/K00 from the NCI to support her doctoral research as well as four years of post-doctoral research.



Rosalie Waller



# SYMPOSIUM AWARDS

*With over 2200 attendees at this year's AMIA Annual Symposium, our department's students, alumni, and faculty had a very strong showing in almost all award categories.*

## **Martin Epstein Award and 1st place Student Paper Competition Winner:** Thomas Reese



When an Alert is Not an Alert: A Pilot Study to Characterize Behavior and Cognition Associated with Medication Alerts

Thomas Reese, Kensaku Kawamoto, Guilherme Del Fiore, Frank Drews, Teresa Taft, Heidi Kramer, Charlene Weir

## **Student Design Challenge Finalists:** J. Fredo Louis and Janette Vazquez

Integrating Personalized and Location Based Consumer Information in a mHealth Application using OpenInfoButton and HL7 FHIR

Jean Fredo Louis, MSLM and Janette Vazquez, MS CS



## **Distinguished Paper Awards:** Omar Bouhaddou and Liqin Wang

Interoperability Progress and Remaining Data Quality Barriers of Certified Health Information Technologies

J. D'Amore, Diameter Health, Inc., Boston University; O. Bouhaddou, S. Mitchell, US Department of Veteran Affairs; C. Li, Diameter Health, Inc.; R. Leftwich, InterSystems, Inc.; T. Turner, US Department of Veteran Affairs, M. Rahn, Office of the National Coordinator for Health Information Technology; M. Donahue, J. Nebeker, US Department of Veteran Affairs

Disease Trajectories and End-of-Life Care for Dementias: Latent Topic Modeling and Trend Analysis Using Clinical Notes

L. Wang, Brigham and Women's Hospital, Harvard Medical School; J. Lakin, Brigham and Women's Hospital, Harvard Medical School, Dana-Farber Cancer Institute; C. Riley, Z. Korach, L. Frain, L. Zhou, Brigham and Women's Hospital, Harvard Medical School

## **Distinguished Poster Awards:**

Clinical Workflows for Collecting Family Health History in Primary Care

R. Waller, B. Hill, H. Kramer, P. Ghani, V. Chidambaram, D. Borbolla, University of Utah, W. Kohlmann, Huntsman Cancer Institute, J. Schiffman, Huntsman Cancer Institute, University of Utah, M. Flynn, R. Hess, K. Kawamoto, G. Del Fiore, C. Weir, University of Utah



Continued from Page 8

#### Ankle Brachial Index Extraction System

P. Alba, S. DuVall, VA Salt Lake City Health Care System, University of Utah; D. Norvell, Spectrum Research, Inc.; K. Moore, VA Puget Sound Health Care System; J. Czerniecki, VA Puget Sound Health Care System, University of Washington; O. Patterson, VA Salt Lake City Health Care System, University of Utah

## 2nd Place Harvard n2c2 clinical NLP challenge

### Track 2: Adverse Drug Events and Medication Relationship Extraction in EHRs:

Jianlin Shi, Alec Chapman, Jianyin Shao, Deep Nag, Olga Patterson, John Hurdle

## Newly Elected Fellows of ACMI:

Catherine Staes and David Vawdrey

## AMIA Leadership Award:

Jeff Nielsen

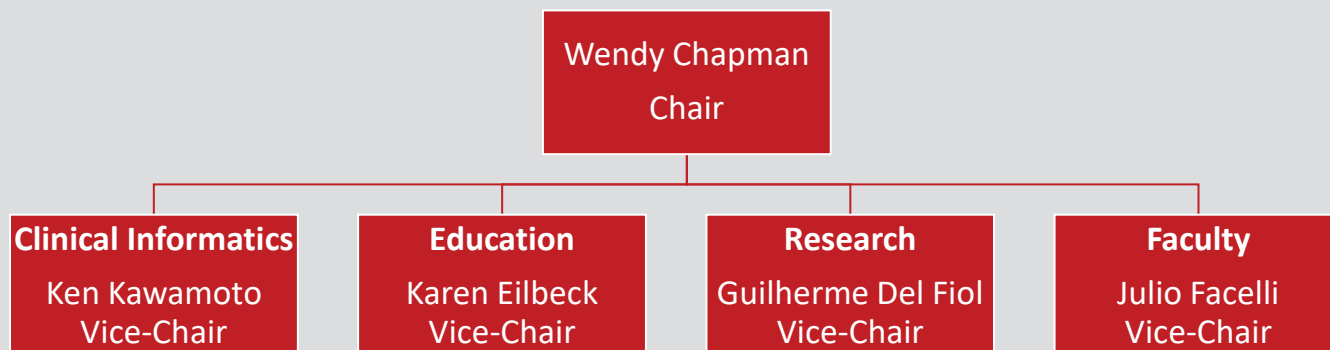
## Homer R. Warner Award:

Scott Narus and Peter Haug

Enhancing a Commercial EMR with an Open, Standards-based Publish-subscribe Infrastructure

S. Narus, N. Rahman, D. Mann, S. He, P. Haug

# DBMI EXECUTIVE LEADERSHIP





# DBMI ALUMNI AWARDS

*Each year our alumni vote on graduates who have made exceptional impact in the areas we value in our department.*



## RELEVANCE

**Beatriz Rocha, MD, PhD '96**

Dr. Beatriz Rocha has been working full-time as a medical informatician for more than 20 years, spending the majority of her time in R&D and the remainder in teaching. After working with Intermountain Healthcare and Partners HealthCare, she currently works at Wolters Kluwer Health as a Senior Medical Informaticist in the area of computerized clinical decision support. Beatriz is working at the epicenter of informatics relevance at the intersection of computerized decision support, knowledge representation, and electronic healthcare records. Over the years, she had also the opportunity to teach various Medical Informatics topics to undergraduate and graduate students,

including creating the first elective course in Medical Informatics offered to the medical students at the Federal University of Parana. Currently, she is the Co-director of the Harvard Medical School "Medical Portuguese" elective class. Beatriz continues the University of Utah legacy of education and application of informatics to improve health care delivery.



## RELATIONSHIPS

**Catherine Staes, BSN, MPH, PhD '06**

Dr. Catherine Staes' expertise involves systems analysis, decision support, and standards in order to improve communication between public health and clinical entities to enable decision making that meets public health goals. This involves understanding current processes for communicating public health guidelines and designing systems and knowledge that can be implemented in the clinical setting. Staes will be inducted as a Fellow in the American College of Medical Informatics (ACMI) November 4, 2018. She currently serves as the Director of the Nursing Informatics Program in the College of Nursing at the University of Utah. Staes has been instrumental in building relationships between clinical and public health informatics, forging an active and exciting partnership between the Utah Department of Health and the University of Utah.



## LEADERSHIP

**David C. Classen, MD, MS '93**

If you mention hospital safety in the U.S., you will hear Dr. David Classen's name. He undertook a series of studies of adverse drug effects and medication safety, and helped develop computerized decision support tools for antibiotic selection that have had sustained impacts on improving outcomes and shortening inpatient length of stay. These studies have been widely cited in the national dialog regarding reduction of medical errors. In 1997 he was named Intermountain Health Care's Researcher of the Year, and in 2000 he joined First Consulting Group and there leads their safety and health

care quality initiatives and consulting practice. His contributions to building programs that measure and improve the quality and safety of health care are recognized by his election to fellowship in the American College of Medical Informatics. Currently, Classen is a internal medicine research professor at the University of Utah.

# Celebrating Collaborations with HCI

Collaborators from the Department of Biomedical Informatics (DBMI) and Huntsman Cancer Institute (HCI) met on Tuesday to celebrate the very successful and ongoing partnerships between colleagues at the two institutions.

Mary Beckerle, the CEO of HCI, expressed how thrilled she was with the incredible capabilities DBMI has and has seen an explosion of potential for future collaboration. There is such a synergy between cancer science and informatics work at the University of Utah. HCI and DBMI are not only impacting care in Utah but are leading the nation in translating research to practice through standards enabled EHR apps.



to identify and manage familial breast and colorectal cancer risk for patients who meet guideline-based criteria for further evaluation.

\$9.7 million PCORI grant in collaboration with the Huntsman Cancer Institute (David Wetter, PI). Through a randomized controlled trial, the study will assess the effect of CDS interventions for tobacco cessation in federally qualified health centers that provide care for underserved communities throughout Utah. Several members of the Reimagine EHR Initiative are co-investigators in the project (Guilherme Del Fiol, Bryan Gibson, Charlene Weir, Ken Kawamoto, and Damian Borbolla).

U24 NCI grant (Guilherme Del Fiol and Ken Kawamoto, co-PIs) focused on population-based CDS to identify patients who meet criteria for genetic evaluation of breast and colorectal cancer risk. Collaborators include DBMI (Charlene Weir, Wendy Chapman), Huntsman Cancer Institute (Josh Schiffman, Wendy Kohlmann), Internal Medicine (Rachel Hess, Michael Flynn), and Intermountain Healthcare (Scott Narus).



F99/K00 NCI grant (Rosalie Waller PI, Nicola Camp and Guilherme Del Fiol primary F99 mentors) focused on bridging translational gaps in genetic risk for complex cancers. The grant provides Rosalie with up to 6 years of career development funding to train in both discovery of novel genes involved in complex cancers and implementation of genetic findings in the clinic.

NCI UO1 grant in collaboration with the Huntsman Cancer Institute (Wendy Kohlmann and Kim Kaphingst, and co-PIs; Ken Kawamoto and Guilherme Del Fiol, co-I's). In a multi-site randomized controlled trial (University of Utah and NYU), the study will compare two EHR-based interventions





# FOUNDERS' FUND

## Help us actualize our vision . . . **BECOME A DONOR**

We aim to create innovative change through the use of information technology in healthcare. This is the legacy of our founders, Homer Warner, Alan Pryor and Reed Gardner and our goal is to continue this legacy.

To continue our efforts, we are seeking your support! Our goal is to raise \$100,000. We have already raised a little over \$60,000 and we need your help to reach this goal.



## ***We invite you to join us***

We are calling it the **3 for 3 Founders' Fund**:

- Pledge \$300/year for 3 years (total of \$900)
- Pledge \$1,000/year for 3 years (total of \$3,000)
- Pledge \$2,000/year for 3 years (total of \$6,000)
- Pledge \$3,000/year for 3 years (total of \$9,000)

*Of course, any gift will be appreciated but we sincerely hope you will consider joining us in pledging a significant gift in honor of our 3 founders.*

**Donate: <https://auxiliary.apps.utah.edu/ugive/designation/96>**