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## PEOPLE

### FACULTY

- Elfar Adalsteinsson
- Daniel G Anderson
- R. Rox Anderson
- John A Assad
- Bonnie Berger
- Nancy Berliner
- Rebecca Betensky
- Sangeeta N Bhatia
- Stephen C Blacklow
- Joseph V Bonventre
- Brett Bouma
- Mary L Boussein
- Louis D Braida
- David T Breault
- Emery N Brown
- M. Christian Brown
- H. Franklin Bunn
- Thomas N Byrne
- Sydney S Cash
- Arup Chakraborty
- Kwanghun Chung



**Martha Lane Gray, PhD (HST '86)**

HST Faculty

J. W. Kieckhefer Professor of Medical and Electrical Engineering, HST, EECS, Massachusetts Institute of Technology

#### Contact Information

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[Lab Website](#)

#### Degrees

PhD in Medical Engineering, Massachusetts Institute of Technology, 1986

SM in Electrical Engineering, Massachusetts Institute of Technology, 1981

W. H Churchill  
Cecil H Coggins  
David E Cohen  
Richard J Cohen  
James J Collins  
Clyde S Crumpacker  
George Q Daley  
Bertrand Delgutte  
Jeffrey M Drazen  
Elazer R Edelman  
Stan N Finkelstein  
Bruce R Fischl  
Sarah Flier  
Jeffrey S Flier  
Stuart A Forman  
Ramon A Franco  
Dennis M Freeman  
Matthew P Frosch  
Barbara C Fullerton  
John Gabrieli  
Lee Gehrke  
Anne B Giersch  
James R Glass  
Wolfram Goessling  
Randy L Gollub  
Martha L Gray  
Julie E Greenberg  
Frank H Guenther  
John J Guinan  
Matti S Hamalainen  
Tayyaba Hasan  
Charles J Hatem  
Thomas Heldt  
Miguel Hernan  
John Higgins  
Robert E Hillman  
Jeffrey Holt  
David E Housman  
Robert D Howe  
Paul L Huang  
Donald E Ingber  
Rakesh K Jain  
Jeffrey M Karp  
William M Kettyle  
Ali Khademhosseini  
James B Kobler  
Isaac (Zak) S Kohane  
Anastasia H Koniaris  
Sharon G Kujawa  
Albert Q Lam  
Robert S Langer  
M. C Liberman  
Stephen Loring  
Jeffrey D Macklis  
Atul Malhotra  
Roger G Mark  
John J Mekalanos  
Daniel M Merfeld  
Matthew L Meyerson  
Leonid A Mirny  
Richard N Mitchell  
Kiran Musunuru  
Joseph B Nadol  
Dava J Newman  
Timothy Padera  
Robert F Padera  
David C Page  
Peter J Park  
Shiv S Pillai  
Thomas F Quatieri  
Bruce R Rosen  
Carl E Rosow  
John J Rosowski  
Robert H Rubin  
Anna Rutherford  
Frederick J Schoen  
Brian Seed

BS in Computer Science, Michigan State University, 1978

### Selected Awards/Societies

Fellow, American Institute of Medical and Biological Engineering  
Editorial Advisory Board of the Journal of Orthopaedic Research  
National Space Biomedical Research Institute Board of Directors  
Orthopaedic Research Society

### Research Interests

Professor Gray's research is geared towards understanding and, ultimately preventing or slowing the cartilage degeneration that affects at least 6 out of 10 people over age 45. Over the last decade, the efforts of Professor Gray and her colleagues have been primarily directed at establishing MRI tools that provide a picture of the biochemical and functional properties of the tissue. Specifically, they have developed and verified a method that indicates the amount of glycosaminoglycan (GAG) in the tissue. Regions of tissue that are functionally inadequate can be distinguished from normal tissue even when the entire tissue is anatomically intact (and looks normal with the usual imaging methods). They have also demonstrated that this imaging method can be used clinically (in vivo in humans) and for basic science studies of cartilage development. She and her colleagues have also shown that differences in GAG correspond with differences in mechanical (functional) tissue properties. Though some important issues remain to be solved before this imaging method becomes, as routine as x-rays are now, there is sufficient evidence to support our optimism that this method could ultimately become a routine tool. To that end, HST researchers are engaged in using this enabling technology for a number of basic science and clinical research.

### Reference Publications

Gray, M.L., Eckstein, F., Peterfy, C., Dahlberg, L., Kim, Y.J., Sorensen, A.G. Toward Imaging Biomarkers for Osteoarthritis. Clinical Orthopaedics and Related Research 427S, 175-181 (2004). Kim, Y-J., Jaramillo, D., Millis, M.B., Gray, M.L., Burstein, D. Assessment of Early Osteoarthritis in Hip Dysplasia with Delayed Gadolinium-Enhanced MRI of Cartilage. The Journal of Bone and Joint Surgery 85-A(10), 1987-92 (2003). M.L. Gray, J. Bonventre, 2002, " Training PhD researchers to translate science to clinical medicine: Closing the gap from the other side," Nature Medicine, 8: 433-436.

### Courses Taught

HST 590 - FA 2015 - Biomedical Engineering Seminar Series	Biomedical Engineering Seminar Series
HST 590 - SP 2015 - Biomedical Engineering Seminar Series	Biomedical Engineering Seminar Series

Rosalind Segal  
Julian L Seifter  
Shiladitya Sengupta  
Margaret Seton  
Jagesh V Shah  
Alex K Shalek  
Phillip A Sharp  
Stefanie Shattuck-  
Hufnagel  
Christopher A Shera  
Barbara Shinn-  
Cunningham  
Harvey B Simon  
Priscilla J Slanetz  
David E Sosnovik  
Myron Spector  
Judith M Strymish  
Steven M Stufflebeam  
Collin M Stultz  
Peter Szolovits  
Clifford J Tabin  
Guillermo J Tearney  
Mehmet Toner  
Benjamin J Vakoc  
Trudy M Van Houten  
Jose G Venegas  
Lawrence L Wald  
William M Wells  
Ziv Williams  
Ioannis V Yannas  
John Yeh  
Laurence R Young  
Seok Hyun Yun  
Warren M Zapol  
Victor W Zue

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