

2016-2017 Undergraduate Catalog

Foreword

This catalog is intended to detail the University's academic programs, policies and services for use by current undergraduate students, faculty, and administrators. We appreciate that applicants, prospective students, and many other people will read this material, as well, for some understanding of University programs and culture.

Information in the catalog is current as of August 2016; the next Catalog will be published in August 2017. In the interim, new courses will be announced in the course schedules which are usually available in November and April and on the Web (www.cmu.edu/hub).

The program requirements and academic policies set forth in this Catalog are subject to change. As a consequence, students are expected to consult with their individual college or department for the most up-to-date information about program requirements, and should consult the University's policy website for the most current statements of University policy.

Any changes or updated information from any member of the campus community should be directed to John Papinchak, University Registrar.

Rodney McClendon Vice President for Operations

Jonathan D. Samuels, Assistant Registrar for Records & Undergraduate Catalog Editor
John R. Papinchak, University Registrar
Published August 18, 2016

Statement of Assurance

Carnegie Mellon University does not discriminate in admission, employment, or administration of its programs or activities on the basis of race, color, national origin, sex, handicap or disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Furthermore, Carnegie Mellon University does not discriminate and is required not to discriminate in violation of federal, state, or local laws or executive orders.

Inquiries concerning the application of and compliance with this statement should be directed to the university ombudsman, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-1018.

Obtain general information about Carnegie Mellon University by calling 412-268-2000.

University Leadership Council

SUBRA SURESH, President.
ANGELA BLANTON, Interim Vice President for Finance and Chief Financial Officer.
GINA CASALEGNO, Vice President and Dean of Student Affairs.
MARY JO DIVELY, Vice President and General Counsel.
FARNHAM JAHANIAN, Provost and Chief Academic Officer.
STEVE KLOEHN, Vice President for Marketing and Communications.
CATHY LIGHT, Interim Secretary of the Corporation; Director, Office of the President.
RODNEY MCCLENDON, Vice President of Operations.
SCOTT MORY, Vice President for University Advancement.
RICK SIGER, Director for Strategic Initiatives and Engagement.

Academic Leadership Council

ILKER BAYBARS, Dean, Carnegie Mellon-Qatar.
AMY BURKERT, Vice Provost for Education.
ROBERT DAMMON, Dean, Tepper School of Business.
REBECCA DOERGE, Dean, Mellon College of Science.
GARY FEDDER, Vice Provost for Research.
JAMES GARRETT, Dean, College of Engineering.
JIMMY HSIA, Vice Provost for International Programs and Strategy.
RAMAYYA KRISHNAN, Dean, H. John Heinz III College.
DANIEL MARTIN, Dean, College of Fine Arts.
ANDREW MOORE, Dean, School of Computer Science.
KATHRYN ROEDER, Vice Provost for Faculty.
RICHARD SCHEINES, Dean, Dietrich College of Humanities and Social Sciences.
MICHAEL STEIDEL, Dean of Admission.
KEITH WEBSTER, Dean, University Libraries.

Officers of the Board of Trustees

JAMES E. ROHR, Chairman.
EDWARD H. FRANK, Vice Chairman.
TOD S. JOHNSON, Vice Chairman.
SUBRA SURESH, President.
FARNHAM JAHANIAN, Provost and Chief Academic Officer.
ANGELA BLANTON, Interim Vice President and Chief Financial Officer.
JAY CALHOUN, Treasurer.
GINA CASALENGO, Vice President and Dean of Student Affairs.
MARY JO DIVELY, Vice President and General Counsel.
CATHY LIGHT, Interim Secretary.
SCOTT MORY, Vice President for University Advancement.
CHARLES A. KENNEDY, Chief Investment Officer.
KAREN T. KHAN, Assistant Secretary.
STEVEN KLOEHN, Vice President for Marketing and Communications.
RODNEY MCCLENDON, Vice President for Operations.
ELIZABETH MILAVEC, Assistant Treasurer.

Voting Trustees

JOEL ADAMS, General Partner, Adams Capital Management, Inc..
JOHN ANDERSON, Distinguished Professor, Illinois Institute of Technology.
LUIS BALL, President, Allegheny Medical Systems LLC.
KEITH BLOCK, Vice Chairman and COO, Salesforce.com.
RONALD BIANCHINI, JR., President and CEO, Avere Systems.
FRANK BRUNCKHORST, Boar's Head Provisions Co., Inc..
ERIC COOPER, .
DAVID COULTER, Special Limited Partner, Warburg Pincus LLC.
RUSSELL CROCKETT, Senior Advisor, C14 Strategy LLC.
JEANNE CUNICELLI, Managing Director, Bay City Capital.
ERROLL B. DAVIS, JR., Interim Superintendent, Atlanta Public Schools.
LINDA A. DICKERSON, Principal, 501(c)(3)2.
PHILIP L. DOWD, Sherick Enterprises, LLC.
FRANCISCO D'SOUZA, President and CEO, Cognizant Technology Solutions.
HOWARD ELLIN, Partner, Skadden Arps Slate Meagher and Flom.
EDWARD H. FRANK, Founder and Sole Proprietor, Compass Vineyards; Co-founder and CEO, Cloud Parity, Inc..
YOSHIKI FUJIMORI, President and CEO, LIXIL Group Corporation.
JAMES GIANOPULOS, Chairman and CEO, Twentieth Century Fox Film.
ERIC GILER, Chairman and CEO, Speedy Packets, Inc..
EDWARD GREFENSTETTE, President and Chief Investment Officer, Dietrich Charitable Trusts.

IRA J. GUMBERG, President and CEO, J.J. Gumberg Co..
 JEFFREY HOUSENBOLD, .
 TORRENCE M. HUNT, JR., .
 LARRY JENNINGS, JR., Senior Managing Director, ValStone Partners, LLC.
 TOD S. JOHNSON, Chief Executive Officer, The NPD Group, Inc..
 RAYMOND J. LANE, Partner Emeritus, Kleiner Perkins Caufield & Byers.
 MICHAEL MCQUADE, Senior Vice President for Science and Technology,
 United Technologies Corporation.
 BRUCE MCWILLIAMS, President and CEO, Intermolecular.
 WILLIAM L. MEANEY, CEO, Iron Mountain.
 ANNE M. MOLLOY, Executive Director, Posner Fine Arts Foundation.
 AMBAR PAUL, Director, Caparo Group Limited.
 DAVID PORGES, Chairman, President and CEO, EQT Corporation.
 JAMES E. ROHR, Executive Chairman, The PNC Financial Services Group,
 Inc..
 JONATHAN ROTHBERG, Founder and Chairman, Butterfly Networks, LAM
 Therapeutics, Quantum-Si, Hyperfine Research, and 4 Combinator.
 DAVID S. SHAPIRA, Executive Chairman, Board of Directors, Giant Eagle,
 Inc..
 AJIT SHETTY, Retired Chairman of the Board, Janssen Pharmaceutica.
 J. LEA HILLMAN SIMONDS, .
 MANOJ SINGH, Chief Operating Officer, Deloitte.
 LUKE SKURMAN, CEO, Niche.
 DONALD E. STITZENBERG, Principal, CBA Associates.
 LIP-BU TAN, Chairman, Walden Internationa; CEO, Cadence Design Systems.
 DAVID TEPPER, President and Founder, Appaloosa Management.
 THOMAS TULL, Founder, Chairman and CEO, Legendary Pictures.
 MARY ANN ULISHNEY, Vice President and Wealth Specialist, Wells Fargo
 Bank, N.A..
 SUNIL WADHWANI, Chairman and Co-founder, iGATE Corporation.
 PAULA KAUFFMAN WAGNER, Producer/Owner, Chestnut Ridge Productions.

RAYMOND SMITH, Chairman, Rothschild Continuation Investments.
 JAMES C. STALDER, .
 W. LOWELL STEINBRENNER, Retired Chairman, Contours, Ltd..
 JAMES M. WALTON, President Emeritus, Carnegie Institute.
 KONRAD M. WEIS, Former President and CEO, Bayer Corporation.

Ex-Officio Trustees

SUBRA SURESH, President, Carnegie Mellon University.
 BRUCE KRAUS, President, Pittsburgh City Council.
 TIMOTHY S.K. LIU, President, Andrew Carnegie Society.
 WILLIAM PEDUTO, Mayor, City of Pittsburgh.
 TODD PRZYBYCIEN, Chair, Faculty Senate, Carnegie Mellon University.
 DEBORAH YUE, President, Carnegie Mellon Alumni Association.

Emeritus Trustees

PAUL A. ALLAIRE, Former Chairman and CEO, Xerox Corporation.
 ARTHUR H. ARONSON, Retired Executive Vice President, Allegheny
 Teledyne.
 JOHN R. BERTUCCI, Chairman, MKS Instruments, Inc..
 CAROL R. BROWN, Former President, Pittsburgh Cultural Trust.
 ROBERT M. BROWN, III, President, B-III Capital LLC.
 FRANK V. CAHOQUET, Retired Chairman and CEO, BNY Mellon.
 W. LOGAN DICKERSON, President, Lindwood Farm, Inc. & Protos Foods, Inc..
 EDWARD DONLEY, Former Chairman, Air Products and Chemicals, Inc..
 DINA DUBLON, .
 WILLIAM B. ELLIS, Retired Chairman and CEO, Northeast Utilities.
 CYNTHIA FRIEDMAN, Co-owner, Union Real Estate Company of Pittsburgh.
 HENRY J. GAILLIOT, .
 CLAIRE W. GARGALLI, .
 WILLIAM GOLDSMITH, Chairman of the Board, Nucon Energy Group.
 RICHARD D. HAMILTON, Retired Director of Product Supply, Procter and
 Gamble.
 WILTON A. HAWKINS, .
 THERESA HEINZ, Chairman, The Heinz Endowments.
 ORION HOCH, Chairman Emeritus, Litton Industries.
 T. JEROME HOLLERAN, Chairman, Precision Medical Products, Inc..
 W. LEE HOSKINS, Retired Chairman and CEO, The Huntington National Bank.
 JUSTIN M. JOHNSON, Retired Judge, Superior Court of Pennsylvania.
 PATRICIA ASKWITH KENNER, President, Campus Coach Lines.
 EDWARD E. LUCENTE, .
 THOMAS A. MCCONOMY, Retired Chairman of the Board, Calgon Carbon
 Corporation.
 JACK E. MCGRATH, Retired Senior Vice President, Booz, Allen & Hamilton.
 REGINA GOUGER MILLER, Owner/Artist, Ginger and Spice; Regina Gouger
 Miller Studio.
 LINDSAY J. MORGENTHALER, .
 ALESSANDRO OVI, Executive Vice President, Fondazione Popoli.
 NORMAN F. PARKER, Retired President, Varian Associates.
 E. KEARS POLLOCK, Retired Executive Vice President, PPG Industries, Inc. .
 CHARLES J. QUEENAN, JR., Chairman Emeritus, K&L Gates LLP.
 JOHN G. RANGOS, John G. Rangos, Sr. Charitable Foundation.
 DAVID M. RODERICK, Former Chairman and CEO, United States Steel
 Corporation.
 VINCENT A. SARNI, Retired Chairman and CEO, PPG Industries, Inc. .
 JOYCE BOWIE SCOTT, J. Bowie Scott Studio.