

# **Workshop on Process Intensification 2014**

Arlington, Virginia, USA  
30 September - 1 October 2014

ISBN: 978-1-5108-1766-1

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2014) by AIChE  
All rights reserved.

Printed by Curran Associates, Inc. (2016)

For permission requests, please contact AIChE  
at the address below.

AIChE  
120 Wall Street, FL 23  
New York, NY 10005-4020

Phone: (800) 242-4363  
Fax: (203) 775-5177

[www.aiche.org](http://www.aiche.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>Process Intensification: Concepts and Applications</b> .....	1
<i>Phillip R. Westmoreland</i>	
<b>Process Intensification</b> .....	12
<i>Adam P. Harvey</i>	
<b>Intensification Concepts for Gas-to-Liquids Processes</b> .....	29
<i>Michael Baldea</i>	
<b>Energy and Information Intensification</b> .....	40
<i>Thomas F. Edgar</i>	
<b>Process Intensification</b> .....	54
<i>Bruce Eldridge</i>	
<b>Advanced Manufacturing, Clean Energy Technologies and Process Intensification</b> .....	65
<i>Mark Johnson</i>	
<b>Systems Analysis of Membrane Reactors for Energy and Environmental Applications</b> .....	93
<i>Fernando V. Lima</i>	
<b>Multi-Scale Approaches for Process Synthesis and Intensification</b> .....	106
<i>Anjan Kumar Tula, Deenesh K. Babi, Rafiqul Gani, Mario Richard Eden</i>	
<b>Process Intensification</b> .....	125
<i>Monica Zanfir</i>	
<b>NSF PI Workshop</b> .....	132
<i>Jeffrey Grenda, David Marler</i>	
<b>Process Intensification in Europe</b> .....	138
<i>T. Van Gerven</i>	
<b>Process Intensification: Application in Pharmaceutical Manufacturing</b> .....	140
<i>Marianthi G. Ierapetritou</i>	
<b>Chemical Reaction Waste Heat Recovery for Process Intensification</b> .....	153
<i>David Vernon</i>	
<b>Process and Catalyst Intensification for Distributed Energy and Chemicals</b> .....	161
<i>Dion Vlachos</i>	
<b>Author Index</b>	