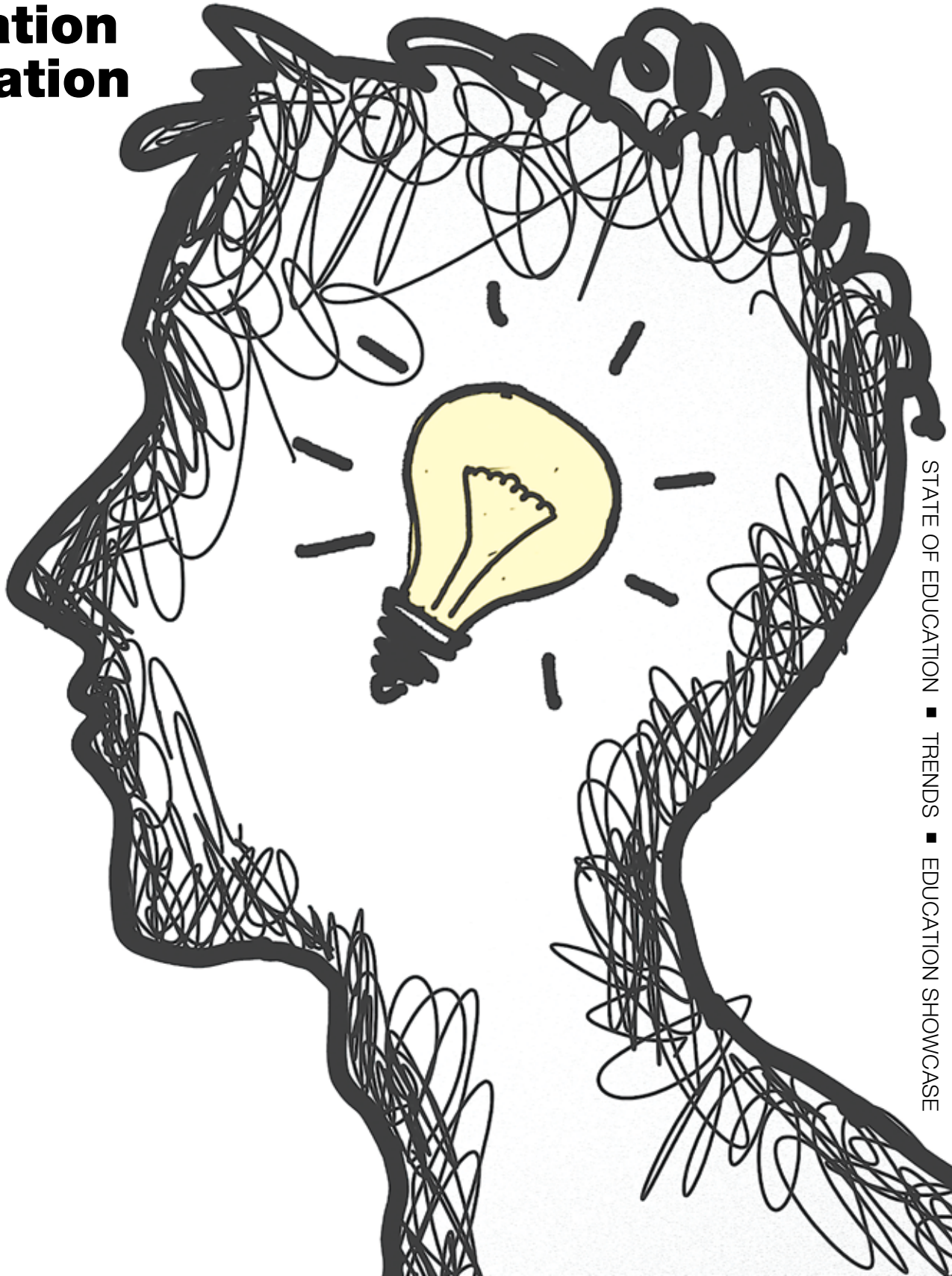
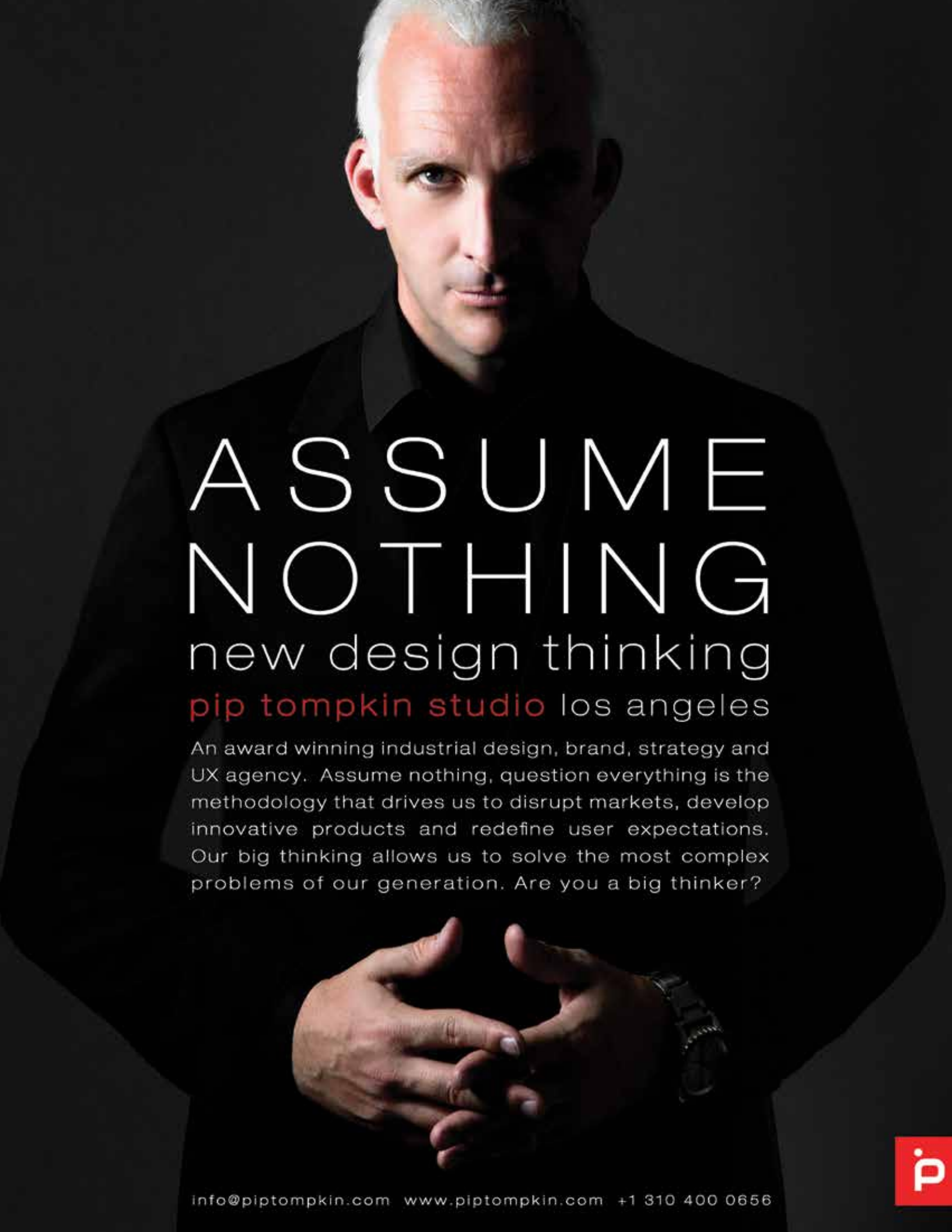
QUARTERLY OF THE INDUSTRIAL DESIGNERS SOCIETY OF AMERICA **WINTER 2014**

INNOVATION

Education Evaluation

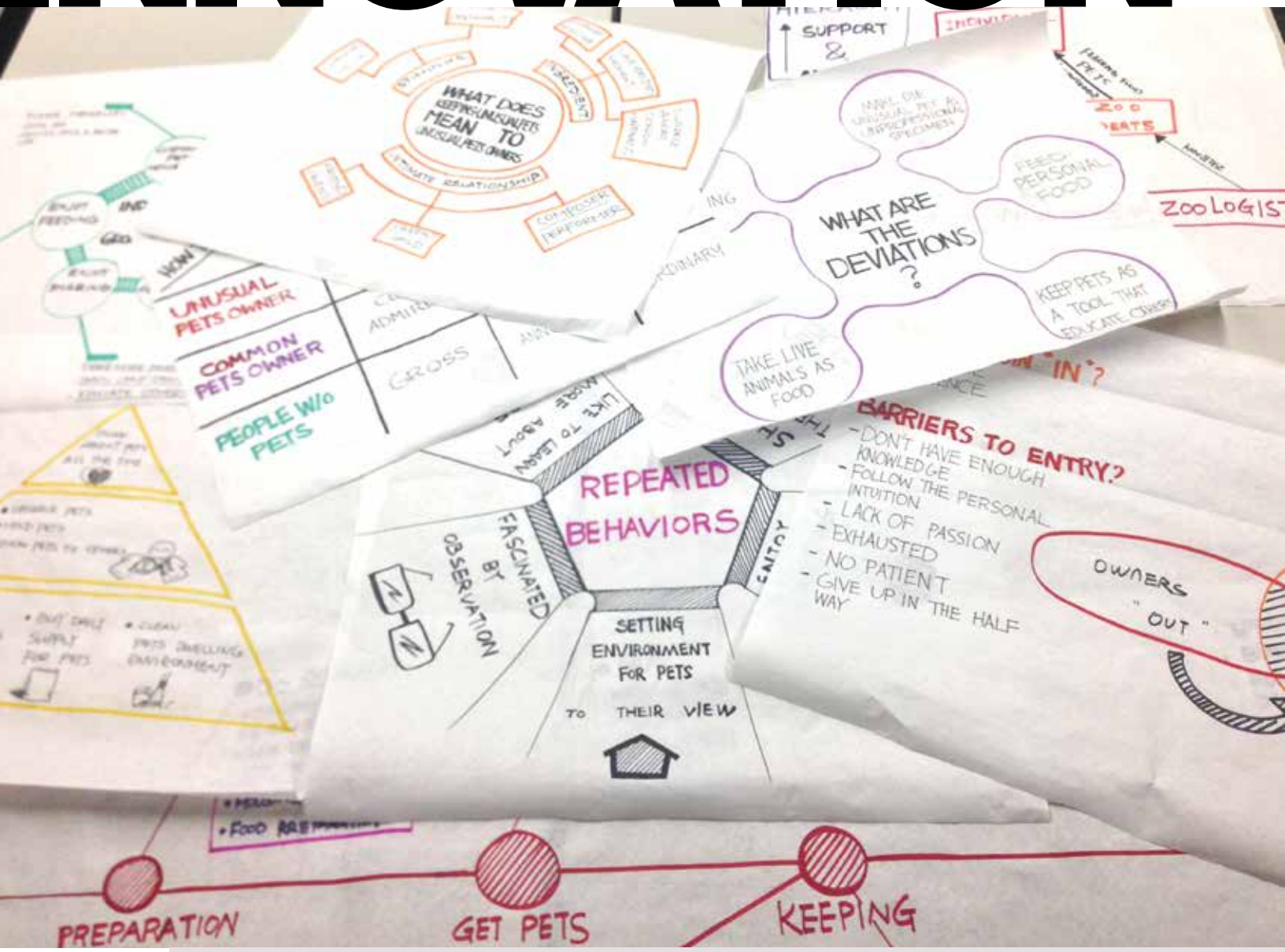


STATE OF EDUCATION ■ TRENDS ■ EDUCATION SHOWCASE


ASSUME
NOTHING
new design thinking
pip tompkin studio los angeles
An award winning industrial design, brand, strategy and UX agency. Assume nothing, question everything is the methodology that drives us to disrupt markets, develop innovative products and redefine user expectations. Our big thinking allows us to solve the most complex problems of our generation. Are you a big thinker?
info@piptompkin.com www.piptompkin.com +1 310 400 0656

QUARTERLY OF THE INDUSTRIAL DESIGNERS SOCIETY OF AMERICA **WINTER 2014**

INNOVATION®



IDSA®

Publisher
IDSA
555 Grove St., Suite 200
Herndon, VA 20170
P: 703.707.6000
F: 703.787.8501
www.innovationjournal.org
www.idsa.org

Executive Editor
Mark Dziersk, FIDSA
Managing Director
LUNAR | Chicago
mark@lunar.com

Advisory Council
Gregg Davis, IDSA
Alistair Hamilton, IDSA

Sr. Creative Director
Karen Berube
IDSA
703.707.6000 x102
karenb@idsa.org

Contributing Editor
Jennifer Evans Yankopolus
jennifer@wordcollaborative.com
678.612.7463

Advertising
Katrina Kona
IDSA
703.707.6000 x100
katrinak@idsa.org

Subscriptions/Copies
Jill Richardson
IDSA
703.707.6000 x118
jillr@idsa.org

Annual Subscriptions

Within the US	$70
Canada & Mexico	$85
International	$125

Single Copies

Fall/Yearbook	$40+ S&H
All others	$20+ S&H

The quarterly publication of the Industrial Designers Society of America (IDSA), INNOVATION provides in-depth coverage of design issues and long-term trends while communicating the value of design to business and society at large.

DESIGN EDUCATION

FEATURES

IN EVERY ISSUE

PATRONS OF INDUSTRIAL DESIGN EXCELLENCE

INVESTOR

IDEO, Palo Alto, CA; Shanghai, China; Cambridge, MA; London, UK; San Francisco; Munich, Germany; Chicago; New York
Newell Rubbermaid, Atlanta, GA
Procter & Gamble, Cincinnati, OH
Webb deVlam Chicago, Chicago, IL

CULTIVATOR

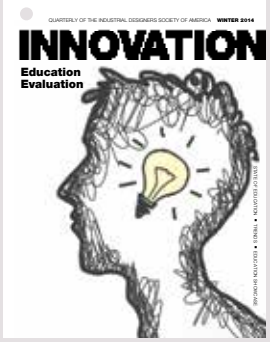
Cesaroni Design Associates Inc., Glenview, IL
Crown Equipment, New Bremen, OH
Dell, Round Rock, TX
Eastman Chemical Co., Kingsport, TN
Jerome Caruso Design Inc., Lake Forest, IL
Lunar Design Inc., Palo Alto, CA
Metaphase Design Group Inc., St. Louis, MO
Smart Design, New York; San Francisco; Barcelona, Spain
Stanley Black & Decker, New Britain, CT
Teague, Seattle, WA
Tupperware, Worldwide

Charter Patrons indicated by color.

For more information about becoming a Patron and supporting IDSA's communication and education outreach, please contact Katrina Kona at 703.707.6000 x100.

Statement of Ownership
Publication: *Innovation*
Publication Number: Vol. 33, No. 4
Filing Date: 10/7/14
Issue Frequency: Quarterly
No. of Issues Published Annually: 4
Annual Subscription Rate: $70 Domestically, $125 Internationally
Mailing Address: 555 Grove Street, Suite 200 Herndon, VA 20170
Mailing Address for Headquarters: Same as above
Owner & Publisher: Industrial Designers Society of America, 555 Grove Street, Suite 200, Herndon, VA 20170
Managing Editor: Karen Berube
Issue Date for Circulation Data: 6/21/14

	Ave. Year	Single
Total Number of Copies:	3,650	3,500
Paid/Requested outside county:	2,750	2,454
Paid in county:	0	0
Sales through dealers/carriers:	188	117
Other classes mailed through USPS:	270	312
Total paid:	3,208	2,883
Free distribution mailed through USPS:	0	0
Total nonrequested distribution distribution:	0	0
Total distribution:	3,208	2,883
Copies not distributed:	441	617
Total:	3,649	3,500



Cover photo: Sketch by Sergey Nivens.

INNOVATION (ISSN No. 0731-2334 and USPS No. 0016-067) is published quarterly by the Industrial Designers Society of America (IDSA)/INNOVATION, 555 Grove St., Suite 200, Herndon, VA 20170. Periodical postage at Sterling, VA 20164 and at additional mailing offices. POSTMASTER: Send address changes to IDSA/INNOVATION, 555 Grove St., Suite 200, Herndon, VA 20170, USA.

Vol. 33, No. 4, 2014; Library of Congress Catalog No. 82-640971; ISSN No. 0731-2334; USPS 0016-067.

Advertisers' Index

By Warren Ginn, FIDSA
warren@ginndesign.com

Warren Ginn is principal of GinnDesign Product Development and adjunct professor of industrial design at North Carolina State University in Raleigh, NC. In addition to promoting materials and processes education within the design community, he was chair of the Materials and Processes Section for over 10 years and has served on the IDSA board as Section VP.

Teaching Materials and Processes

FROM EVANGELIST TO EDUCATOR

For the past 20 years I have been promoting the value of materials and processes education within the industrial design community as well as working to improve collaboration between the industrial design, business, engineering and manufacturing communities. As designers of product experiences that often manifest themselves in tangible manufactured artifacts, it is incumbent upon industrial designers to understand the nature of materials, their manufacturing processes and their relationship to a product's design.

During my tenure as the chair of the IDSA Materials and Processes Section, I was often contacted by professors and graduate teaching assistants tasked with teaching materials and manufacturing in their industrial design programs. They were seeking guidance on how to deliver this content to their students. What textbooks should they use? How should this information be presented? What are the most important concepts or ideas that need to be conveyed? These questions were a challenge to answer since the subject of materials and manufacturing is so broad and, for many institutions, time is limited in an increasingly crowded curriculum.

While I have been delivering workshops and presentations to students for years, only recently (Fall 2011) have I been involved in the teaching of a materials and processes class within an industrial design curriculum (NC State University, my alma mater). Despite my expertise in materials and manufacturing, teaching the subject to students proved much more challenging than I expected. This eye-opening experience has changed the way I think about this subject and how it might be taught. As I enter my fourth year teaching, I try to keep the following observations and insights in mind.

Make the argument. As a champion for materials and processes education, educators should make the argument to their students: explain why materials and processes education is important to them as designers. As industrial designers, we should be constantly looking for ways to leverage our creativity and value within our organizations to serve as the product's advocate through the entire design process. That empathy extends to all stakeholders in addition to the user experience, including marketing, research, engineering, manufacturing and beyond. Good design strives to keep all these needs satisfied.

By understanding how a product is manufactured and the implications of each decision made along the way, a designer can ensure that everyone's objectives are met while the design intent is preserved (or at least while the appropriate compromises are made). If the designer doesn't remain engaged to address these issues and be a part of that process, someone else will end up doing it.

Remember when you didn't know. The technical and complex nature of materials and manufacturing can be quite challenging for some design students to learn and even more so to apply. Remembering what it was like when you first learned this subject can help you to identify with the struggles of your students. In his recognition of the shortcomings of lecture-based teaching, Harvard physics professor Eric Mazur points out that the better you know something, the more difficult it becomes to teach. **We forget what it was like not to know something and learn it for the first time. This lack of empathy for those we are teaching creates a disconnect between the educator and student—making learning more difficult.** Mazur's solution is to engage the students in the process of teaching as well as learning by encouraging peer-based instruction in which the students who understand the material teach the students who are still struggling to learn it.

Distinguish between Internet knowledge and internal knowledge. Educators and students should differentiate between Internet knowledge and internal knowledge. With ubiquitous access to the Internet, one might argue that simply having access to this information is as effective as knowing it. Unfortunately, there is no substitute for reading, understanding and internalizing the basic concepts of materials and manufacturing. This subject requires specific fundamental knowledge that includes a mastery of the language of materials and manufacturing. This understanding allows designers to communicate more effectively with engineers, materials suppliers and manufacturers.

It is also important to distinguish between what designers should know and what they should be able to look up. Of course, there are considerable resources (like material databases and design guides) that designers can access online. But while these references are useful in developing specific design solutions (how thick does this nominal wall need to be?), they are no substitute for understanding the basics of a manufacturing process or the general properties of a particular material. When sitting across the table from your client or a manufacturing engineer, stopping to look up the definition of "thermoforming" on your phone may not make the best impression.

Teach the language of manufacturing. I liken materials and processes education, with its specific technical jargon and terminology, to teaching a foreign language. There is a basic vocabulary (terms like "draft," "nominal wall" and "undercut") as well as conversational manufacturing (how you might discuss your product concepts with an engineer or manufacturer). Using these terms and expressions in class as well as in studio can help students become accustomed to using these terms correctly and understanding what they mean to them as designers.

Field trips are also extremely effective in exposing students to the manufacturing community and the language used. For programs located in areas where field trips to local manufacturers aren't possible, consider inviting manufactur-

ing reps and engineers as guest speakers to discuss how they work with industrial designers. They, too, will expose the students to this new language.

Connect materials to products. Associating specific materials and processes with specific types of products can be an effective method of understanding and remembering different material properties. One example might be to associate products that require chemical resistance and durability at a low cost with materials like polyethylene and polypropylene. Another example might be to associate commodity consumer electronics with ABS, but higher-end and more ruggedized electronics with ABS/PC. If a student understands why these products are associated with these materials, they can transfer those properties to new product concepts (leading to such a deduction as, "if polypropylene is used for this product, maybe it will make sense for this new project because it shares many of the same properties and performance characteristics").

Understand where 3D printing and rapid prototyping fit. Like other rapid prototyping and molding processes, 3D printing should be taught as another viable manufacturing process. However, while the array of 3D printing technologies offer unique opportunities and specific advantages for certain applications, they're not a panacea or universal replacement for all other processes. Every manufacturing process has its advantages and disadvantages, and 3D printing is no different. Students should understand where these technologies fit in their tool belts.

Create forensic designers. One measure of success for materials and processes education is the creation of life-long forensic designers. When designers are out in the world, every object they interact with should be an opportunity to ask, "How is this made and why?" and more importantly, "How could I make this product better?" By figuring out these answers for themselves, they learn from the experience and file that new knowledge away for future use.

I frequently do this myself (much to the exasperation of my wife), and hardware stores like Home Depot are my favorites. I hold my final materials and processes class at a Home Depot where the students and I tour the store pulling products off the shelf and discussing how they're manufactured and why.

In addition, product autopsies or dissections are one of the most effective hands-on experiences where designers (young and old) can discover for themselves how products are manufactured. We all have products that are unused or broken that can be used as valuable learning opportunities, and the resulting parts can be contributed to your materials library.

Extend the reach of materials and processes education. With limited resources and an overburdened undergraduate curriculum, many industrial design programs are forced to require only one three-hour materials and processes class. However, courses in sketching, CAD, design research, entrepreneurship and professional practices as well as the industrial design studios all present opportunities to build on the concepts learned in the materials and processes class. By collaborating with other faculty members to interconnect these other core courses, this important content can be extended and reinforced throughout the program.

Make a connection. Every student is different and brings their own unique perspective, interests and method of learning to the classroom. Some students will be very enthusiastic about materials and processes, while others may require more support to make the subject relevant and compelling. Learning how to read the class and adjust to the students has taken some time, but teaching has taught me to be more reflective of my own work and approach to design and how to share my knowledge and experience with my students more effectively.

Recently a student sent me this email: "So tonight I went to Bed Bath and Beyond and found myself picking up random products and flipping them over, trying to guess what they were made out of. Haha, thanks for that." Perhaps I'm starting to make a difference. ■

AUTODESK®
FUSION 360™

‘So intuitive I got right into it, started creating like I was using my hands.’

Erica Nwankwo,
MFA Candidate, Industrial Design

Students and educators get free* access to Autodesk® software including the next generation 3D product design tool, Autodesk® Fusion 360™

www.autodesk.com/education

AUTODESK.

**Free Autodesk software and/or cloud-based services are subject to acceptance of and compliance with the terms and conditions of the license agreement or terms of service that accompany such software or cloud-based services. Software and cloud-based services provided without charge to Education Community members may be used solely for purposes directly related to learning, teaching, training, and research and development that are part of the instructional functions performed by a primary or secondary educational institution or any degree-granting or certificate-granting institution or any learning, teaching or training facilities. Such software and Cloud-based services shall not be used for commercial, professional or for-profit instructional or any other purposes.*

To participate in the Autodesk Education Community, you must agree to and comply with the applicable Terms of Use and also satisfy the following eligibility requirements. You must be one of the following: (a) a faculty member; or (b) a student; or (c) an Autodesk Assistance Program participant.


ALPINE HEADPHONES - NOW AVAILABLE AT YOUR LOCAL APPLE STORE
LUNAR