



BIOINSPIRED!

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THE BIOMIMICRY INSTITUTE

The Biomimicry Institute in 2007 (Bryony Schwan)

As we begin a new year of work at The Biomimicry Institute (TBI) and I reflect back on 2007, I feel a tremendous sense of gratitude about the opportunity to do this amazing work and to also work with the incredible people in the biomimicry community. While the Institute was incorporated in 2005, the Institute really came into its own in 2006 but even then we were limited by resources. 2007 was a real leap forward for TBI as we began to build infrastructure and develop an incredibly competent staff team.

Here are few highlights of what we accomplished in 2007:

- After doing a national search for an education director we ended up hiring a small but extraordinary education team because we realized through the search and interview process that the scope of the job was too big for one person to do well. We hired Sam Stier, a conservation biologist with an extensive education background, in a full-time position to develop our K-12 and public education programs. We hired Cindy Gilbert, a wildlife biologist, to develop our college and university level program. Cindy also has extensive education experience. We also hired Denise DeLuca, a LEED certified civil engineer with experience in green building and sustainability issues, to develop an outreach program to engineering and architectural schools. Last month, Angela Klinefelter joined the staff as Financial and Administrative Assistant.
- In June we hosted the Biomimicry Education Summit, the first gathering of current practitioners. Twenty-five



Biomimicry Education Summit

professors and teachers from the US, Canada, Europe, Mexico and China gathered for three and a half days at the University of Montana's Yellow Bay Biological Station to share best practices and strategize about introducing biomimicry into both K-12 and university curricula.

- In May we sponsored the fourth Biologist at the Design Table (BaDT) course (training biologists to inspire innovators at the design table) in Montana. Twenty remarkable biologists completed the now expanded seven-day course.
- Cindy Gilbert developed a university-level course for TBI that she piloted last fall semester at the University of Montana.
- Denise DeLuca spent much of 2007 planting the seeds of biomimicry by giving public lectures and workshops at Tecnologico de Monterrey (Mexico), University of Colorado - Boulder, University of Montana, Middlebury College, beaming Bioneers (Bozeman), Montana State University, and Harvey Mudd College. Outreach efforts in 2007 have led to a full calendar of events and projects for the first half of 2008. In addition, Denise has been working with Dayna Baumeister to plan for the two-year Certificate Program in Biomimicry in May of this year.
- Sam Stier has already developed a variety of K-12 educational material including a one-week curricula unit on biomimicry designed for public and private middle schools, with an emphasis on climate change and biomimetic approaches to solving this major human sustainability challenge. He has also created a PowerPoint presentation introducing biomimicry to 4th graders, a PowerPoint presentation and number of short outdoor exercises introducing biomimicry to

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The Biomimicry Institute in 2007 (*continued*)

under-served 5th grade students and the first curriculum piece designed for outdoor education programs. The project introduces biomimicry through exploring the differences between conventional and organic agriculture.

- We planted the first seeds for the “Innovation for Conservation” program that enables companies to donate a percentage of the sales of products and processes that were inspired by nature. These funds would then be used to help protect and restore the home habitats of the organisms that inspired the breakthrough. We have developed a working document on the program’s operational guidelines (or the DNA as we like to call it) and in 2008 we hope to secure the program’s first major gift.
- We made significant headway on the Biomimicry Design Portal. When completed, the portal will be the world’s first digital library of nature’s solutions and online information exchange between biologists and innovators. The portal will resolve the most consistent challenge that practitioners of biomimicry design have - the lack of access to relevant biological information organized by design and engineering function. In January '07 we contracted John Webb to act as the project coordinator. John developed a sharp project scope (road map) for the project as well as a feasibility study to analyze possible software solutions for the portal. We are thrilled to report that we will be using the Natural Capital Institute’s Wiser Earth platform (<http://www.wiserearth.org>) and we hope to have the next prototype ready by spring. Unfortunately, in November John left us to take a job he could not refuse with one of the top Internet firms in New York (we are pleased he continues to serve as an advisor on the

project). Chris Allen has now taken over as project coordinator.

- We launched the Children’s Biomimicry Music CD project with singer/songwriter Amy Martin and the Coyote Children’s Choir.
- In collaboration with Exploration Works, a new science museum based in Helena, Montana, Sam is developing biomimicry displays that will be featured alongside other exhibits.
- In 2007 we began an exciting collaboration with the Zoological Society of San Diego that we will tell you more about in the months to come.



Amy Martin

There was also a lot of other great work accomplished in 2007 that I did not cover here (it would just take up much too much space). However as we look forward I am even more excited about the work that lies ahead. We are in the process of completing a three-year strategic business plan for the Institute. I want to take this opportunity to thank our wonderful staff, Board of Directors, volunteers and interns for all their hard work. I also want to thank all our generous donors for their support: we could not do it without you.

[Bryony Schwan](#)
Executive Director



Singing and Dancing Our Biomimicry Message - One Song at a Time (Cindy Gilbert)

The Biomimicry Children’s Album seeks to inspire children, parents and teachers around the world to embrace and understand the emerging concept of biomimicry, helping create a more sustainable world through the versatile and ideal medium of music. Today’s children need positive solutions and realistic tools, such as biomimicry, to address the environmental challenges that they will grow up with. This album will help to inspire and motivate them to make a difference. It is one way that we hope to bring our positive message to the ears of people all around the world. The Biomimicry Children’s Album will include 15 danceable songs that have an underpinning theme of finding solutions to human problems from nature.

The songs and music for the album have been written by Montana singer/songwriter and community activist Amy Martin who has shared the stage with Bruce Cockburn, Indigo Girls, Pete Seeger and beyond. Each song will prominently feature the voices the 17 girls and boys that make up the Missoula Coyote Children’s Choir as well as lead vocals by celebrity artists. So far, we have recruited some of the best session musicians in the United States to play on our album including drummer Allison Miller (Ani DiFranco & Natalie Merchant’s band), guitarist Adam Levy (Norah Jones’ band), bassist Todd Sickafoose (Ani DiFranco’s band), and keyboardist Julie Wolf (Indigo Girls’ band). We are also reaching out to a wide variety of celebrity vocalists from





Singing and Dancing Our Biomimicry Message (*continued*)



The Missoula Coyote Children's Choir

To track this project's progress as we get closer to our recording and release dates in 2008, please visit http://biomimicryinstitute.org/childrens_album.html. Feel free to contact Cindy Gilbert, our children's album project coordinator, if you have any questions about this exciting project.

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different genres to lend their voices to the project and to help us raise the profile of the project. We are elated to report that Ani DiFranco, Sharon Jones and Brandi Carlile have already committed to sing on our album! The album will be recorded in Montana in late April and with an anticipated release date in late fall.

'Patterns from Nature' Update (*Norbert Hoeller*)

The 'Patterns from Nature' project was kicked off in late 2006 through an article in the *BioInspired!* Newsletter and a post to the Biomimetics listserver. Eighteen people representing a broad range of interests and disciplines volunteered, of which eight have been part of the core team from the beginning. The group identified a compelling need for a tool to organize knowledge about biological systems in a structured fashion and facilitate inter-disciplinary communication, particularly with researchers and practitioners not fluent in biology. 'Pattern language' emerged as one way to accomplish this.

- The ability to use 'common language', helping a broader audience gain value from the content
- The ability to handle breadth as well as depth, to whatever level is appropriate
- The ability to solve larger problems through a series of smaller solutions developed using the explicit linkages between patterns (the pattern language)

Strengths of Pattern Language

The pattern language approach was developed in the late 1970s by Christopher Alexander to capture the characteristics that made good architecture 'whole' and 'alive' Pattern languages combine a unique set of features that make them particularly useful for complex and evolving knowledge domains:

- A simple yet powerful structure that describes the problem and the steps involved in developing solutions (individual patterns)
- A process for creating and using these patterns
- Rich content about the domain of knowledge represented by the patterns

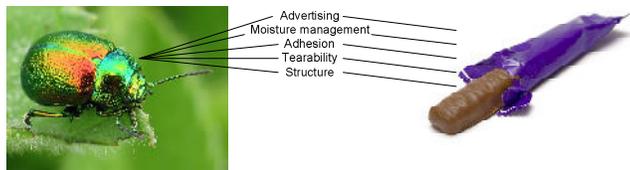
Ecosystem Patterns

Although pattern languages are usually built 'from the bottom up', the group decided to start with ecosystem principles, with the goal of identifying 'deep patterns' that could be applied to human challenges. To date, the team has explored three principles:

- Ecosystems tend to use materials effectively for multiple functions
- Ecosystems tend to create conditions favorable to sustained life
- Ecosystems tend to be made up of interdependent cooperative and competitive relationships



'Patterns from Nature' Update (continued)



Beetle cuticle vs. candy wrapper

The 'Multi-Functional Materials' proto-pattern contrasts the tendency of living systems to use a small set of materials for multiple functions, whereas we employ chemistry to develop new materials for each desired performance characteristic or function. Research by Julian Vincent (University of Bath) suggests biological manipulation of the embedded structure of materials dramatically reduces energy requirements, compared to our "heat, beat and treat" approach that uses energy to remove and then impose structure ([Biomimetics listserver post](#)). An example of leveraging the inherent qualities of materials is the [JANO Dual Bike](#), designed by Roland Kaufman. He discovered that wood is significantly stiffer than fiberglass or even Kevlar/epoxy composites. By using wood veneer, Kaufmann was able mold wood into shapes that combined lateral stiffness with the shock absorption of carbon fiber and the responsiveness of steel.

The 'Conducive to Life' proto-pattern looks for mechanisms underlying the balanced, rich, diverse and vibrant communities of species that we see in healthy ecosystems. On the surface, natural selection working at the level of individual organisms would appear to encourage competition and declining diversity, attributes we often ascribe to human systems. Complexity theory and research on Self-Organizing, Hierarchical, Open (SOHO) systems suggests that open systems through which high quality energy flows tend to display emergent properties and spontaneously self-organize. 'Free energy' appears able to create 'order out of disorder', if other enabling conditions are satisfied. [Regen Energy](#) uses self-organization and principles of [swarm theory](#) to develop autonomous, self-organizing agents that collectively manage peak power consumption (see the [December 2007 BioInspired! Newsletter](#)).



Web of Life
[The Grinning Planet](#)

The group found substantial overlap between the 'Interdependence' and 'Conducive to Life' proto-patterns. In order to differentiate them, the team is exploring more complex networks such as food webs. The complexity of these systems appears at odds with their resilience - the group is exploring a number of avenues to reconcile the apparent paradox. Early results reinforce the importance of maintaining the overall health of a complex ecosystem, rather than targeting a specific issue. One example might be the work of [Ducks Unlimited](#) to restore wetlands and reverse declining waterfowl populations.

Implications

Energy is woven through all of the three patterns. New research in thermodynamics suggests that energy is different from other resources. With the exception of atmospheric gases lost to space, materials on Earth can be recycled indefinitely, although they may at times be trapped in forms that are not easily accessible over the short term. On the other hand, energy cannot be recycled completely. Work can be turned into heat, but heat cannot be converted into an equivalent amount of work. Ultimately, we rely on energy from the sun and, to a lesser extent, geothermal energy from radioactive decay deep within the Earth. Any other forms of energy are prone to depletion unless usage is matched to the rate of replenishment.

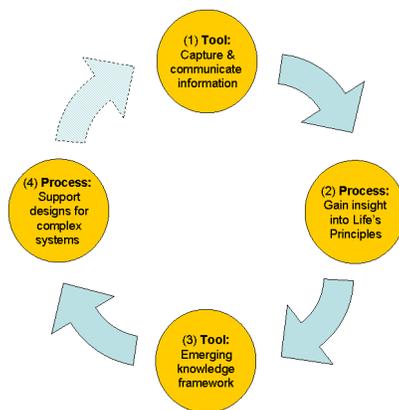
One way in which humans have been able to skirt energy issues is through heavy reliance on 'heat pathways', an ability rarely seen in other living systems. John Reap (Georgia Tech) suggests there may be natural limits on energy usage by organisms across a wide scale. Total human energy consumption significantly exceeds this limit, especially when compared to the low metabolic rate of humans and large primates. By tapping into fossil fuel, we have been able to temporarily 'step out of the game', driving our explosive development at the cost of dependence on shrinking supplies.

Project Status

The team started looking at 'pattern language' as a tool or a method to solve a specific problem: how we can organize, communicate, and make biological information available to other disciplines. As we began to develop patterns around the ecosystem principles, the pattern language methodology encouraged us to gain greater insight into what each ecosystem principle means and how this knowledge could be applied to understanding human systems.

Pattern languages can capture evolving knowledge about complex systems as well as the gaps in that knowledge. Such a framework could help practitioners leverage this incremental knowledge

and also encourage research to close the gaps. Pattern languages could also support design in complex, dynamic environments by encouraging practitioners to explore problems in depth, rather than jumping immediately into finding a solution. The multi-scale aspect of pattern languages helps practitioners look at how their solutions 'fit' within the larger context, while the communication and collaboration aspects help them deal with multiple stakeholders.



Project Evolution



'Patterns from Nature' Update (*continued*)

The work of the team has been presented at the 2007 Society of Experimental Mechanics, with the team's first paper published in the conference proceedings. An update was presented at Biomimetics 12 in Bath (UK) late in 2007. The latest information will be presented at the Institute of Biological Engineering conference in early March. Discussions are underway to submit a paper to the peer-reviewed Journal of Biological Engineering.

For more information, please visit the [Patterns Wiki](#). The Wiki is accessible by anyone, although you need to login to download most documents and create or modify content.

Please contact me through the link below if you have questions or are interested in being part of the project. We are particularly looking for expertise in non-equilibrium thermodynamics, exergy (a measure of energy quality), ecosystem dynamics and self-organizing systems.

[Norbert Hoeller](#)



Acknowledgements:
beetle: © Igor Gorelchenkov – FOTOLIA
candy bar: © Marc Dietrich – FOTOLIA
Web of Life: The Grinning Planet®

BIONIS: the BIOMimetic Network for Industrial Sustainability (*Jo Lakeland*)

Jo Lakeland is a lecturer in Engineering at Reading University. Her background is first in meteorology and then in teaching Physics in High School, which together with a passionate interest in geology lead to a concern for the environment and how we could make better use of its resources. Her recent Masters Degree in Renewable Energy and the Environment at Reading lead to becoming the Coordinator for the BIONIS network in 2001.

Early Days

The idea of a biomimetics network originated from the realization that biomimetics could provide new approaches to sustainability in an industrial context. **BIONIS** was founded in 2002 with the object of fostering collaborations between UK biomimetics researchers and UK industry, but it soon grew far beyond that. **BIONIS** now has more than 400 members, worldwide, 50 of them from the USA.

BIONIS was launched with the help of UK Science Council Funding, and immediately began to grow. The **BIONIS** website (<http://www.biomimetics.org.uk>) was launched in October 2002, with on-line registration for members a year later. Once registration has been approved, the new member can search the members' database, which allows them to contact biomimetics researchers, industrialists with an interest in biomimetics and others who want to learn more about biomimicry in more than 40 countries. They also receive a popular monthly newsletter by email.

The first BIONIS meetings were held approximately every six months in different parts of the UK, with themes such as Biomimetics & Textiles and Commercial Applications of Biomimetics. In 2005 things changed: a Management Committee was formed from volunteer members, each with a responsibility for one of the network's twelve focus areas, which were chosen with industrial applications in mind. One of these volunteers was Lars- Uno Larsson, the Founder of Swedish Biomimetics 3000®, and sponsor of BIONIS for the next two years.

BIONIS Grows

By then membership had reached 250, and **BIONIS** had become international. One of the first decisions of the Management Committee was to plan an Annual Conference, rather than smaller meetings. The first Conference was held at the prestigious Bath Royal Literary and Scientific Institution, Bath, UK, in September 2007. The theme was *Successful Biomimetics* – and it was certainly a great success, with delegates from all over the world.

Lars- Uno also sponsored the First **BIONIS** Award, which was awarded to a young researcher to enable travel to centers of excellence in biomimetics research worldwide. The standard of applications was very high, and the winner was Dr. Carlo Menon of Simon Fraser University, Vancouver. The award ceremony was at the conference, followed by the Prize Winner's lecture. A summary of this and the other conference presentations are on the Members page of the **BIONIS** web site,

<http://www.extra.rdg.ac.uk/eng/BIONIS/members.htm>

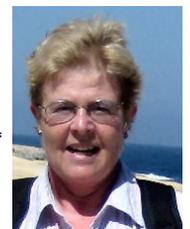


Menon and Larsson

The Future

BIONIS is now sponsored by the University of Reading, UK, funding a network coordinator for one day per week and allowing Network activities to continue. The next conference will take place in September 2008: we are looking for a sponsor for the **BIONIS** Award. **BIONIS** has become a leading international biomimetics network, and we have ambitious plans for a full-time network coordinator to develop the network to its full potential.

[Jo Lakeland](#)



Acknowledgements:
BIONIS Award: © JC Lakeland, 2007



Swedish Biomimetics 3000® (*Lars-Uno Larsson*)

Lars-Uno Larsson is an entrepreneur specialized in identifying new evolving market segments. In 1988 he established a pharmaceutical company, Swedish Orphan International AB, specializing in the development and distribution of Orphan drugs for the treatment of rare disorders. For this initiative Lars-Uno Larsson received "The International Humanitarian Award 1998" and "The Entrepreneur of the Year Award in Sweden 2002".

In spite of significant investments in Research & Development by governments, industry and academic institutions, the commercialization of innovation has not kept pace, both in terms of yield (the percentage of innovations that reach market) and speed (time to market). [The Innovation Gap - Accelerating the Commercialization of University Research](#) (MassMEDIC 9th Annual Conference) suggests one reason is the short 'shelf-life' of innovations: key people and resources may be redeployed to other initiatives if research is not commercialized quickly. Another issue is the 'implementation gap', the no-man's land in the innovation chain between research institutions and industry. Ideas that look good in the laboratory need to be proven in scalable, real-world situations before industry can assess the risks and costs of commercialization.

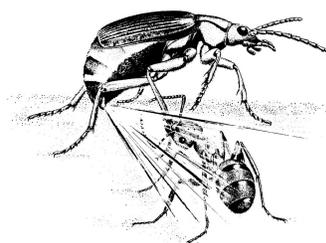
The 'implementation gap' can be particularly difficult to bridge for bio-inspired innovations. Although nature provides proof that the idea can work, incomplete understanding of the natural processes, cultural differences between engineers and biologists, difficulty in translating natural processes into technology and not including business skills early in the development process can dramatically increase the perceived risk. Bio-inspired solutions can also be counter-intuitive (as the best innovations often are), which only increases the challenge. Any delays in the development and demonstration process can derail progress.

Lars-Uno Larsson founded Swedish Biomimetics 3000® in 2004 and the UK subsidiary Swedish Biomimetics 3000® Ltd in 2006 to "globally identify promising designs/innovations inspired by nature ... [and] to fund and foster translational research of biomimetics concepts to the point that they are considered commercial candidates." The company is structured on an in-house developed V²PIO operating model:

- Virtual: maximize use of professional global organizations (such as [Quintiles Consulting Europe](#)) to access established competencies, increase flexibility and enhance deliverability
- Venture: taking and managing risk
- Philanthropic: look beyond short-term profitability
- Intersectional: a catalyst, merging multiple disciplines by building a 'consortium of skills'
- Organization: a 'starfish', standalone organization

Swedish Biomimetics 3000® provides a range of lifecycle business support, including technical, quality, regulatory, cultural, financial, intellectual property and managerial functions. Cutting edge firms are brought in early to resolve issues, whether they relate to technology or market needs. At all times, the focus is on moving clearly defined applications of the core technology to a pre-commercial stage as fast as possible, generating the required documentation to ease the transition to commercialization partners who will take the innovation to the marketplace. In parallel, the technology continues to be developed by retaining the scientists in the core program.

Swedish Biomimetics 3000® has been a key player in the development of the μ Mist™ spray system, inspired by the Bombardier beetle ([Beetles Inspire a New Generation of Technology](#)). Basic research was carried out by Professor Tom Eisner of Cornell University. He then cooperated with Professor Andy McIntosh of Leeds University and research assistant Novid Behesthi, who with support from the



Bombardier beetle in action

Engineering and Physical Sciences Research Council successfully researched the principles of the beetle's unique spray system. Swedish Biomimetics 3000® worked closely with Leeds University in a development consortium including Quintiles Consulting Europe to build an experimental device with a combustion chamber modeled on that of the Bombardier beetle, but scaled up to a chamber length of two centimeters. The device is able to spray droplets from two to 100 microns in size for up to four meters. The ability to control critical mist parameters including droplet size, velocity and temperature makes the system ideal for drug delivery applications in medicine, fuel injection systems, fire extinguishers and fire suppressants. These and a number of other possible applications show potential for being more environmentally-friendly than current approaches.



μ Mist™ Test Chamber



Swedish Biomimetics 3000® (continued)

Another program supported by the company is μ LOT™, a radical process technology for accelerating concept commercialization in pharmaceutical drug development. In addition, μ LOT™ supports natural, recyclable reaction substrates which may be used with water, resulting in new green, process methodologies that reduce pharmaceutical waste streams.

Swedish Biomimetics 3000® is an example of an 'innovation capitalist'. According to [A Buyer's Guide to the Innovation Bazaar](#) (HBR, Jun 1/2007), these are "firms, often with a particular industry expertise, that seek out and evaluate ideas and technologies from the inventor community and other external sources. They develop and refine those ideas to the point where their market potential is validated, and they then pitch them to large client firms. An innovation capitalist reduces a client company's acquisition costs and early-stage risks."

By "defining measureable objectives and setting realistic schedules, building joint teams in a consortium and, above all, anticipating and mitigating risks", the highly structured program management approach of Swedish Biomimetics 3000® rapidly brings programs to a successful conclusion. Swedish Biomimetics 3000® is demonstrating that biomimetic innovation can be turned into valued and valuable products and services, while dramatically accelerating the timeline from concept to market.

[Lars-Uno Larsson](#)



Acknowledgements:
Bombardier beetle and μ Mist™ Test Chamber images provided by Prof. Andy McIntosh (University of Leeds)

Mechanosensors: From Biological to Bionic Systems (Rolf Mueller and Marion Malkoc-Thust)

The principal objective of the [CILIA](#) project is to identify the common principles underlying the widespread use in nature of arrays of mechanical sensory cells for the extraction of meaning under adverse conditions and to make those principles available for design of engineered systems. For each sensing scenario (in air, in water, and in a fluid-filled compartment coupled to air through impedance matching devices and beam-forming baffles), adaptations across phylogeny and ontogeny will be studied.

A summer school on bioinspired mechanosensors will be held on Spain's Costa Brava from March 30th to April 3rd, 2008.

The summer school is primarily aimed at PhD students and young researchers as well as newcomers in the field of mechanosensor systems. It will afford an opportunity for establishment of scientific and personal contacts between the participants. Topics covered include biological mechanosensory systems, fluid dynamics, modeling of system dynamics, artificial sensors, and use of bioinspired sensors in robotic systems.

Well-known experts in the scientific disciplines covered by the school will give the lectures. At present, invited speakers include:

- Christoph Bruecker (TU Bergakademie Freiberg)
- Friedrich G. Barth (University of Vienna)
- Ray Meddis (University of Essex)
- Mitra J. Hartmann (Northwestern University)

- Jason Lohn (NASA Ames Research Center)
- Sietse van Netten (University of Groningen)
- John R. Buck (University of Massachusetts Dartmouth)
- Werner Gnatzy (Universitaet Frankfurt)
- Wolf Hanke (Harvard University)
- Joseph A. C. Humphrey (University of Virginia)
- John Miller (Montana State University)
- Andrew Dacks (University of Arizona)

The school will be held in the Eden Roc in Sant Feliu de Guixols, Girona, about 100 km northeast of Barcelona. It is being organized by the Cilia project, an interdisciplinary research project sponsored by the European Union. More information can be found at http://www.cilia-bionics.org/summer_school_details.

[Rolf Mueller](#) and [Marion Malkoc-Thust](#)



Calling all Biologists! 2008 Biologists at the Design Table (BaDT) Workshop *(Cindy Gilbert)*

Would you like to use your knowledge of biology and natural history to help designers, architects, engineers and business people create a more sustainable built environment?

The fifth BaDT Workshop is planned for May 30-June 6, 2008 at the Theodore Roosevelt Memorial Ranch in Dupuyer, Montana with guest lectures by the co-founders of the Biomimicry Guild, Janine Benyus, author of ***Biomimicry: Innovation Inspired by Nature***, and Dayna Baumeister, PhD.

This intensive and applied course in biomimicry is intended to give hands-on training to people with backgrounds in biology, ecology and/or natural history to help meet a growing demand for biological knowledge from companies trying to solve design challenges in the human built environment.

What you'll learn:

- A proven method for bringing nature's ideas to the design table
- Introduction to the design process
- How to apply biological knowledge to design challenges
- Examples of biomimetic success stories
- How to facilitate biomimetic design
- A whole new way of viewing and valuing the natural and built world

For additional information and application materials, please visit <http://biomimicryinstitute.org/education/training/> or contact me directly by clicking on my name below. All applications must be received by March 14th.

Cindy Gilbert, M.Ed., M.S.
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Calendar of Public Events

Date	Location	Event
Mar 6-9, 2008	Chapel Hill, NC	13th Institute of Biological Engineering Conference
Mar 17-19, 2008	Southampton, UK	Biological Approaches for Engineering
Mar 20-22, 2008	Dallas, TX	NCIIA 12th Annual Meeting , includes biomimicry workshop
Mar 30-Apr 3, 2008	Girona, Spain	Mechanosensors: From Biological to Bionic Systems
Mar 31-Apr 3, 2008	Melbourne, Australia	Fibrous Proteins: transforming structural knowledge into new materials

Date	Location	Event
May 30-June 6, 2008	Dupuyer, Montana	Biologists at the Design Table
June 24-26, 2008	The Algarve, Portugal	Design and Nature 2008
Oct. 10-12, 2008	Changchun, China	The 2nd International Conference of Bionic Engineering
Oct. 14-18, 2008	Nanjing, China	International Symposium on Nature-Inspired Technology
Oct. 16-19, 2008	Minneapolis, Minnesota	ACADIA 2008: Silicon + Skin, Biological Processes and Computation



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"Biomimicry (from *bios*, meaning life, and *mimesis*, meaning to imitate) is a new science that studies nature's best ideas and then imitates these designs and processes to solve human problems. Studying a leaf to invent a better solar cell is an example. I think of it as "innovation inspired by nature."

The core idea is that nature, imaginative by necessity, has already solved many of the problems we are grappling with. Animals, plants, and microbes are the consummate engineers. They have found what works, what is appropriate, and most important, what lasts here on Earth. This is the real news of biomimicry: After 3.8 billion years of research and development, failures are fossils, and what surrounds us is the secret to survival.

Like the viceroy butterfly imitating the monarch, we humans are imitating the best and brightest organisms in our habitat. We are learning, for instance, how to harness energy like a leaf, grow food like a prairie, build ceramics like an abalone, self-medicate like a chimp, compute like a cell, and run a business like a hickory forest.

The conscious emulation of life's genius is a survival strategy for the human race, a path to a sustainable future. The more our world looks and functions like the natural world, the more likely we are to endure on this home that is ours, but not ours alone."

[A Conversation with Janine Benyus](#)

[BioInspired!](#) is published quarterly and is posted on a public-access [Weblog](#) hosted by TypePad. For those of you familiar with RSS Readers, TypePad supports various feed formats (look for the [Subscribe to this blog's feed](#) link in the right navigator).

Comments can be posted on the newsletter Weblog. At this time, the TypePad RSS feed does not deliver comments.

If you wish to subscribe to this newsletter, please complete the [E-newsletter sign-up](#) form.

Last, but not least, please send any feedback or comments to:

[Norbert Hoeller](#)



Clippings, Resources and Events

Three public-access Weblogs hosted on TypePad are now available to share information of interest to the Biomimicry Community.

- [Clippings](#): short articles relating to Biomimicry.
- [Resources](#): pointers to more extensive information.
- [Events](#): workshops and relevant conferences.

These Weblogs can also be monitored with your favorite RSS Reader. Anyone can post comments. Please be aware that TypePad requires an e-mail address and will display this

address to people viewing the comment. Each Weblog has a 'sticky' post at the top with suggestions on how to reduce the impact of getting SPAMed.

Past issues of John Mlade's [BioInspire](#) magazine are posted on ThinkCycle. BioInspire will be migrated to TypePad shortly.

Contributions of clippings, resources and events are greatly appreciated! Please see the note at the top of each Weblog for instructions.

Thanks, Norbert Hoeller

A CALL TO TEACHERS AND STUDENTS OF BIOMIMICRY ~

If you are integrating biomimicry into your teaching or learning, we want to hear about it! Just fill out the on-page form you'll find on the web at <http://sinet.ca/tinc?key=zkJeYXyN&formname=BioEducation>. When you're done filling out the information, you simply click on "ok" (lower right) and you're done. Thanks in advance!