

## **Charles Ostman**

2615 Shasta Rd.  
Berkeley CA 94708

tel 510 549 0129 fax 810 821 7218  
email [charles000@aol.com](mailto:charles000@aol.com)  
URL <http://www.technofutures.com/charles1.htm>

"What appears to be the future for many, is already the past for some who are unfolding it into the present." C. Ostman

**Chairman, Technology Committee - NanoSig**  
**Senior Fellow - Institute for Global Futures**  
**Senior Consultant – Strategic Synergy Group**  
**Senior Associate - Foresight Institute**  
**Science Advisory Board – Legendary Pharmaceuticals**



**Strategic Research**  
**Technical Due Diligence**  
**Technology Development Services**  
**Industry Analysis & Forecasting**  
**Presentations and Public Speaking**  
**Technical Editing and Authoring**

### **Professional History - Previous:**

**Chief Scientist – Evolutionary Networks**  
**Instructor/Faculty-S.F.S.U.(San Francisco State University)**  
**Instructor/Faculty-A.A.C (Computing Facility, S.F.)**  
**Founder - Berkeley Designs**  
**Technical Editor/Author - Midnight Engineering**  
**Science Editor/Author - Mondo 2000**  
**Contributing Editor/Author - Robotics Digest**  
**Contributing Editor/Author - Microcomputer Journal**  
**Dir. of Media Dev., Science Advisory Board - Nanothinc**  
**Droid Works (Div. of Lucas Films)**  
**Integrated Automation (Div. of Litton Industries)**  
**GTE Lenkurt (Microwave Systems Development Group)**  
**Phoenix Laser Systems**  
**Omni Scientific Instruments**  
**Los Alamos National Laboratory**  
**Lawrence Berkeley Laboratory (U of Cal., Berkeley)**

## **Biographical Synopsis:**

8/01 – present

### **Chair, Technology Development Committee - NanoSig**

Palo Alto, CA

NanoSig is a non-profit organization dedicated to fostering the commercialization of nanotechnology by providing angel, VC, and corporate investors access to companies, products, technologies, and people. Areas of interest include nanomaterials, instrumentation, tools, integrated nano and micro scale systems, biological systems, software and informatics related systems – and combinations of these. NanoSig provides a forum for investment facilitation services, such as *technical due diligence, presentations, scheduled events, industry analysis*, and other interrelated activities which foster the business development of nanotechnology.

1/96 - present

### **Senior Fellow - Institute for Global Futures**

San Francisco, CA

The Institute for Global Futures is a strategic technologies consulting group which provides *strategic research, industry analysis, technical due diligence, presentations and reports, and related business development services* to Fortune 500 companies and institutions worldwide, with a particular focus toward examining the synergistic relationships between emergent advanced technologies, and the business environments in which they may be fostered.

### **Mission of the Institute - advise leaders and organizations:**

- 1) About the future impact of high technology trends
- 2) About the key strategies and opportunities that will enable to better adapt and meet the new challenges of the global digital economy of the 21st century

### **Executive Summary:**

Complex new technologies are rapidly transforming markets, economies, and industries. The Institute for Global Futures was founded to promote the productive, sustainable and strategic use of advanced leading edge technologies. The Institute was founded by Dr. James Canton, Executive Director, an internationally recognized futurist who has advised organizations, institutions and governments for over twenty years on the impact of high technology on business, consumers, markets and society.

### **Current Strategic Technology Studies:**

Biotechnology, Nanobiology, and Bioinformatics  
Nanotechnology and Molecular Manufacturing  
Network Computing and Computing "Fabrics"  
Evolvable Systems, Digital Genetics, "Gel Ware"  
The Future of Telecommunications  
Experiential Media, Knowledge Evolution, and Education  
Virtual Reality and 3D Worlds  
Smart Media Appliances and Transactional Devices  
Consumer and Business Applications of Artificial Life  
Intelligent Agents, Agent "Societies" and Systems  
Mind-Machine Interface Technology  
Mobile Autonomous Robots

## **Partial List of Presentations and Lectures at Recent Conferences and Events:**

- 5<sup>th</sup> Bi-Annual Futurists in Telecommunications Conference – UCLA
- SVASE forum – Investment Opportunities in Nanotechnology 2001
- NanoPlanet Conference – Strategic Trends and Developments in Applied Nanotechnology 2001
- Strategic Imperatives in New Business Models presentation – USF, 2001
- Strategic Decision Making in the Realtime Connected Economy seminar – SFSU, 2001
- Technology Forecast 2001 Forum - Pasadena, 2000
- World Multiconference on Information Systemics, Cybernetics, & Informatics, 98, 99
- Multi-Agent Spatial Modeling Symposium - 2000, UCLA
- Biota III - Digital Biota conference - San Jose State University - 2000
- Technolink Association conference on the Digital Divide - The New Revolution '99
- International Conference on Information Systems Analysis and Synthesis, 98, 99
- Strategic Implications of the Internet - The Duke Advanced Management Program, 99  
Duke University, Fuqua School of Business
- Alife VI - UCLA, 98
- Global Biotechnology Development Megatrends - Tech Trends 2000 - UCLA
- The Emergent age of the 3<sup>rd</sup> Millennium - The Biotech Age - UCLA
- AAAI Conference on Computational Anthropology, 97
- Prudential Life Financial Services Annual Senior Account Management Forum
- COMDEX - fall 95, 96, 97
- SigGraph 94, 95, 96, 97, 98, 01
- WorldMovers 97
- Aspen Summit 98, "Virtual Humans" in Computing and Telemedia - Aspen Institute
- Earth to Avatars - SFSU
- Paradox Seminar I - Arcosanti Institute
- Frontiers of Science and Media Technologies 98
- InterMedia World
- Contact Consortia XIII, XIV, XV
- Entcon 95, 96, 97
- SXSW 97 - Future of Electronic Media
- Connectionism in the Next Century Symposium - Pepperdine University

1/97 - 99

**Instructor / Faculty - S.F.S.U. (San Francisco State University)  
San Francisco, CA**

Example course curriculum:

### ***Strategic Decision Making in the Realtime Connected Economy***

Approaching mission critical strategic decision boundaries in today's realtime, connected e-commerce economy presents a set of challenges, operational process dynamics, and organizational infrastructure modalities to management hierarchies, where the requirement is to adapt and evolve in an **operational ecology** which is in an accelerating state of change.

***The Paradigms of Evolution in a Connected Economy -  
Emergent Technologies, Key Trends, Business Models***

Virtual commodity assets, and the valuation and distribution thereof, are becoming the core resource base from which emergent economic systems architectures are rapidly transforming the "operational norm" of economic system substrates of the current era. In a sense, a self evolving system is being "spawned", which can adapt readily to a self evolving marketplace with an evermore rapidly accelerating rate of change and infrastructure "adjustment" factor.

***IT resource management - emergent technologies, key trends, business models***

To compete and flourish in the competitive environment of the realtime connected economy, the strategic decision rendering process absolutely requires a precise "lock" on not only the technologies, value chain elements, and market trends of the moment, but as detailed and sophisticated as possible projections into future scenarios, where potential conditions for alliance formation, emergent knowledge resources, alternative outsourcing option matrices, parallel resource allocation and market vectors are contiguously updated and engrained into the overall operational process model.

***Evolution into the Next Millenium -  
the Media Matrix and Life on the Virtual Terraform***

Without question, there is a state of change at hand, the rate of which itself is an acceleration vector never before experienced in all of known recorded human history. The contextual relationships between rapidly evolving technologies, ever expanding volumes and complexities of information resources, and socio-economic systems which are being spawned from a domain which I refer to as the *virtual terraform*, are going to reshape almost every aspect of life as it is currently understood to be.

**Biographical Synopsis:**

The author's 25+ year professional history and combined experience in *physics, specialized materials, electronic and electro-optical hardware, computer science, telecommunications, and a plethora of related fields of technology development*, along with considerable technical and "popular" media content development, with a specific focus toward analysis of emergent market and technology trends, has provided a unique "insider's view" of much the technical and scientific developments which will have significant social, economic, and cultural implications in the near future.

Aside from currently being a senior fellow for the Institute for Global Futures, and a participant in various educational and institutional projects and curricula, he is also on the editorial staff of several technology related journals (see included references). Mr. Ostman has authored numerous articles appearing in a variety of technical and peer reviewed industry trade journals, such as Telecommunications, Computer Graphics World, and Innovation

He is often consulted as a reference for a variety of print and online media publications, including various nationally broadcast radio and television programs. Examples of previous interviews can be found in various online resources such as Discovery Channel Online, 21st Century Online, and "Inside".

After a long professional history, (see included references and occupational description) including involvement in computing, communications, signal processing, and artificial intelligence related technology development projects at various companies and "start-up" organizations, he launched his own company, Berkeley Designs. This is a company which focused primarily on the development of

proprietary technologies and systems, strategic research and analysis, and technical media authoring. Berkeley Designs has also been a beta site for a variety of newly emerging software and hardware products, and has worked with other production / development facilities in a variety of arenas of interest, including *autonomous intelligent agents, communications related technologies, artificial life, machine vision, optical computing, and various computational processes which mimic the physiologies of living systems.*

Mr. Ostman has lectured at numerous conferences and technology related events, throughout the US and abroad, including a recent series of lectures and presentations on virtual reality applications in **Brazil**, at the **Candido Mendes Cultural Center in Rio**, and the super computing facility in **Port Alegre**, lectured and presented at the **Electronic Media Facility at Banff, Canada** (please see extended list of recently published peer review papers, and conference presentations listed below). He has been a guest speaker at numerous academic and public institutions, such as the **San Jose Science and Technology Museum, the Exploratorium, the Tesla Society**, and a variety of academic and institutional campuses nationwide. Also, he is a regularly featured speaker and presenter at the **EntCon** conferences held annually in Boulder, Co, and the **Tech Trends 2000** conference series in Los Angeles, where he outlines emergent technologies, market and economic trends, and policy imperatives.

Additionally, the author's materials have been published in a wide variety of technical and academic reference manuals, such as the **1994 Applied Sciences SirS educational reference journal (Applied Science Press, ISBN# 0-89777-445-0)**,. References to Mr. Ostman's previous and current projects also appear in a variety of books and publications, such as the recently published "**Interactive Book**", **Celia Pearce**, ISBN 1-57870-028-0, and "**Avatars**", **Bruce Damer**, ISBN 0-021-68840-9

6/89 - 00

#### **Founder, Developer - Berkeley Designs**

Berkeley Designs is a company which focuses primarily on the development of proprietary technologies and systems, strategic resources research, and technical authoring/editing services. Also, the company has explored various "experimental" techniques in 2D and 3D computer generated imagery, virtual worlds and synthetic environments, algorithmically derived dynamic and pseudo-organic computational processes, and related specialized software and rendering techniques for the visualization of complex events and data.

Besides being highly familiar with current developments in 3D volumetric scanning and topographical feature capture technologies relevant to the creation of static and real time 3D environments, Berkeley Designs has also been a beta site for a variety of newly emerging software and hardware products, and has worked with other production / development facilities in a variety of arenas of interest, including intelligent agent technologies, artificial life, machine vision, optical computing, and various computational processes which mimic the physiologies of living systems.

---

6/93 - 97

#### **Science Advisory Board, Director of Media Development, Contributing Editor / Author**

##### **Nanothinc**

San Francisco, CA

Nanothinc is a web based content provider, the mission of which is to attract a broad global audience and provide a multimedia rich interactive forum providing nanotechnology related information services, research, and strategic resources. As a member of the science advisory board, responsibilities include continual ongoing research into *current nanotechnology related developments*, such as *engineered materials, nanoscale electronic devices, self organizing/self assembling materials and molecular component systems, molecular computing, and related aspects of current and near future applications development*. Also, a considerable collection of written materials and technical papers have been authored and posted on the site, and ongoing editorial obligations include several nanotechnology related columns, most recently consisting of journals on the topics of *biocomputing, and biomolecular "logic" and machine systems*.

Additionally, Mr. Ostman has created a variety of 3D renderings and dynamic models of various synthetic environment "nanoworlds" and nano domain realms, as part of an ongoing investigation into the behavioral and visual modeling of such nano component systems. Published on this site are numerous technical and "popular interest" papers on the topics of nanotechnology, authored by Mr. Ostman and other contributors.

---

9/90 - Present

**Author/Technical editor - Midnight Engineering magazine**

Rocky Ford, Colorado

Midnight Engineering magazine is a bi-monthly technical trade journal with a national circulation of 50,000. The focus is primarily towards the entrepreneurial engineering, "high tech" development community, particularly in the areas of software development, custom computer system applications, and related topics. The author has written extensively on general subjects ranging from virtual reality, 3D rendering techniques, artificial intelligence and neural net computing systems, to "exotic" materials, virtual reality, robotics, and recent developments in *nanotechnology, including the creation of models of virtual nano-environments, molecular assembly components and component systems, self replicating and self modify-ing molecular "machines", quasi-viral components and pseudo-organelles.*

---

4/97 - Present

**Author/Contributing Editor - Robotics Digest**

Robotics Digest is a newly founded technical trade journal which focuses on all aspects of robotics systems development and engineering related topics. This arena of interest can encompass topics ranging from *artificial intelligence and sensory cognition, to advanced electro-mechanical subsystems, and even such diverse subjects as specialized engineered materials, telerobotics technologies, and hybrid computing systems.* This is the first nationally circulated journal of its type which provides a comprehensive technical and industry reference to the robotics development community. Recent advances in the development of onboard intelligence, neuromorphic processing capabilities, and tele-robotics communications and precision remote manipulatory techniques have combined to produce a dramatic upsurge in robotics systems development activities, and growth in market shares and volumes. This journals timely inception is designed to meet this rapidly changing situation, and the plethora participants within this demographic.

6/93 - 00

**Science Editor/Author - Mondo 2000 magazine**

Berkeley, California

Mondo 2000 is a "cutting edge" technology, culture, and art focus publication with a worldwide circulation of 100,000. Particular attention has been aimed at such subjects as virtual reality, interactive media, educational and cultural implications of newly developing *computer and communication technologies, scientific discoveries and developments that have far reaching sociological, cultural, and political implications, and related topics.* In particular, the author has written considerable content on such topics as nanotechnology, mind/machine interface, the quasi-organic attributes of the global internet system, and a broad range of other current and future technologies, not only from a purely scientific or technical perspective, but also with an eye towards the cultural implications and global sociallogical affects that will result from these various scientific developments.

---

Author -

Mr. Ostman has authored numerous articles appearing in a variety of technical and peer reviewed industry related trade journals, such as *Telecommunications*, *Computer Graphics World*, *Innovation*, and online publications such as *21st Century Online*, and *Inside*

Author  
**CyberLife ISBN# 0-672-30491-0**  
**Sams, a division of McMillan Publishing**  
New York, New York

This book is currently in circulation in most major book stores, and is a compendium of various papers and sections covering a range of current and future technologies and scientific topics. The section contributed by the author contains a series of papers on various aspects of nanotechnology, specifically in the realms of *molecular computing, biomolecular "devices" and artificial pseudo organisms, nanobiological and medical applications, and cybernetic enhancements of the human body.*

Author  
**Secrets ISBN# 0-936085-33-9**  
**Blue Heron Press**  
Hillsboro, Oregon

This book, recently released and in circulation now, contains essays and papers on the general topic of "how a culture sublimates the things that seem to threaten the established order, creating secrets kept by individuals as well as institutions". The author's writings in this publication delve into the technical, and operational details of the marketing of personal data as a commodity, the involuntary immersion of the general population into a ubiquitous, universal data grid as a cultural "norm", artificial intelligence applied to surveillance and monitoring processes, and related topics.

.....  
**Previous Professional Experience**

Professional experience began with 8 years at **Lawrence Berkeley Laboratory, Los Alamos Laboratory**, and other sites in the National Laboratory system, in electrical engineering, systems architecture design, solid state physics and materials science research. This included work with Dr. David Johnson (founder of TiNi Alloy, Inc.) on the early development of shape changing alloys and their applications, with particular focus on MEMS (Micro Electro-Mechanical Systems) and integrated microsystems. Additional research and development work involved the design and implementation of a variety of other specialized electronic instrumentation, detector and measurement hardware, and computer interfacing for applications ranging from alternative energy research to physics related electronics and hardware systems.

Mr. Ostman continued his interests in computing, materials science, and "intelligent" signal processing development. Over the next several years, he had co-developed electronic and electro-optical components for an intracellular *ophthamological surgery laser system* at Phoenix Laser Systems. Additionally, he worked on design and development of *synaptical simulation electronics, optical correlation and neuromorphic process elements, image processing and recognition, and neuralnet computing modalities and systems* with Dr. Scott Davis at U.C. Berkeley.

This was followed by the cumulative 15+ years of technical, and project management experience in the private sector, beginning at the microwave systems development lab at **GTE Lenkurt**. Mr. Ostman's persistent interests in materials science, signal processing, and systems design eventually led to the development of optical recognition and machine vision hardware and systems at **Integrated Automation** (div of **Litton Industries**).

He was subsequently offered a position at the **DroidWorks** (then a division at **Lucas Films**), working on development on advanced DSP (Digital Signal Processing) and proprietary computing and electronic media hardware designs, with Dr. Andy Moore (who later co-founded Sonic Solutions) and John Snell,

After a continual involvement in computing, communications, signal processing, and artificial intelligence related technology development projects at various companies and "start-up" organizations, he launched his own company, **Berkeley Designs**. Berkeley Designs is a company which focuses *primarily on the development of proprietary technologies and systems, strategic research and analysis, and technical media authoring*. Berkeley Designs has also been a beta site for a variety of newly emerging software and hardware products, and has worked with other production / development facilities in a variety of arenas of interest, including *autonomous intelligent agents, communications related technologies, artificial life, machine vision, optical computing, and various computational processes which mimic the physiologies of living systems*.

The author's 25+ year work history and combined experience in *physics, specialized materials, electronic and electro-optical hardware, computer science, and a plethora of related technology development*, along with considerable technical and "popular" media content development has provided a unique perspective to provide something of an "insider's view" of much the technical and scientific developments which will have significant social, economic, cultural, and political implications in the near future.

Mr. Ostman has lectured at numerous symposia, conferences and technology related events, throughout the US, Canada, and abroad. He has been a featured guest speaker at venues such as the **San Jose Science and Technology Museum, the Exploratorium, the Tesla Society, the Aspen Institute**, and a variety of institutes and academic campuses nationwide. Also, he is a regularly featured speaker and presenter at the EntCon conferences held annually in Boulder, Co, and the Tech Trends 2000 conference series in Los Angeles.

Additionally, the author's materials have been published in a variety of technical and academic reference manuals, such as the **1994 Applied Sciences SirS educational reference journal (Applied Science Press, ISBN# 0-89777-445-0), and the academic text Writing and Reading Across the Curriculum (College Div. of Harper Collins)**.

**Excerpt from the newly released book by Celia Pearce, "the Interactive Book":**  
ISBN 1-57870-028-0

#### **A-Life of One's Own - V-Art**

Another A-life alchemist is **Charles Ostman**. Ostman's interest lies in the interface between nature and machine. His specialty is nanotechnology. Nanotechnology is a technique of manipulation at the molecular level that enables you to do things such as create self-assembling materials, micro-machines, and pseudo-viruses. Self-assembling materials -which at one time were called "nano-leggos" until the name had to be changed due to trademark disputes -consist of molecules that can be manipulated through input (such as heat or electrical charge). Pseudo-viruses, perhaps the most interesting of the nano-technological applications, are "good" viruses designed to use the viruses' own techniques to outsmart it. Pseudo-viruses, really anti-viruses, do the same thing to the virus that the virus is attempting to do to the host. It thus quickly eliminates the intrusive organism, letting the healthy host cell return to its proper function. For more on Charles Ostman, you can visit the Nanothinc site at: <http://www.biota.org/ostman/charles1.htm>

## **Excerpt from the newly released book by Bruce Damer, "Avatars":**

ISBN 0-021-68840-9

### **Life in Digital Space - Bots, Biota and Virtual Pets The NanoWorlds of Charles Ostman**

*Charles Ostman* is a real wonder of a "Professional Synergist" from Berkeley, California. Ostman brings his years of experience in building successively smaller and more complex electronics at Lawrence Berkeley labs and intense interest in Nanotechnology to bear through his organic art vision. Ostman's works seek to give us a reflection from a future "virtual terraform" inhabited by "synthetic sentients".

Ostman sees a time in the future when Nanotechnology (the ability to make things one atom at a time) renders all current economic systems obsolete and transforms human lifestyles and our very perception of reality. Ostman is science editor for *Mondo 2000* and a frequent guest on Art Bell's *Coast to Coast* all night radio show. The basic inspirational building blocks of Ostman's art include molecular machines, self-assembling "nano lego" components, nanobots and nanocritters, pseudo proteins, quasi viral components, "artificial" organisms, and ubiquitous nano "foglettes". Visit the NanoWorlds of Charles Ostman at Berkeley Designs' Web site at: <http://www.biota.org/ostman/charles1.htm>

### **Partial list of recently published papers and conference presentations:**

**Paper titled "Transactional Process Brokeraging of Virtual Commodity Process Assets - an Emergent Economic Ecology". accepted for publishing and presentation in both the SCI 99 and ISAS 99 conferences**

- 5th International Conference on Information Systems Analysis and Synthesis,
- World Multiconference on Information System Analysis and Synthesis, July 31 - August 4, 1999  
Orlando, Florida

**Paper titled "Synthetic Sentience as a Strategic Commodity Resource" accepted for publishing and presentation in both the SCI 98 and ISAS 98 conferences**

- 4th International Conference on Information Systems Analysis and Synthesis,
- World Multiconference on Information System Analysis and Synthesis, July 12 - 16, 1998  
Orlando, Florida

**SigGraph 2001, Los Angeles,**

**Lecture/presentation on the "Anthropological Emergence of Artificial Life in a Human / Digital Biota Symbiosis"**

**Contact 2001 – "The In-Silico Biology Paradigm: Gateway to Virtual Exobiology"**

**Tech Trends 2000 conference series, July 22 1999 Los Angeles, Futurists in Telecommunications "the Digital Divide - Cultural and Economic Imperatives".**

**Tech Trends 2000 conference series, April 21 1999 Los Angeles, Life Science Industries on the Edge of the New Millennium "Global Biotechnology Development Megatrends - The Biotech Age".**

**Tech Trends 2000 conference series, October 14, 1998 Los Angeles, Transformation of the Telecommunications Industry for the Year 2000 Convergence "The New Age of International Business - Is the Global Marketplace Prepared for the Paradigm Shift"**

**1999 -Digital Biota III, Conference on Digital Biota and Virtual Worlds for Artificial Life - San Jose State University, Dept of Mathematics and Computer Science.  
"Anthropological Implications of Digital Biota"**

1999 - Executive Education Advanced Management Program - Duke University, Fuqua School of Business. "Strategic Implications of the Internet"

Lecture/presentation at the Contact Consortia XV conference "Process Modalities of Applied Computational Resources which Mimic the Physiologies of Living Systems", as a mechanism for communication to real and synthetic entities  
March 6 - 8, 1999 Santa Clara

Paper/lecture presented to the Contact Consortium  
- CONTACT XIV Conference, March 7-10, 1998  
"Development of Linguistic Systems and Communications Protocols with Societies of Artificial Lifeforms and Synthetic Sentients"

Summer 1997 meeting of the Tesla Society – San Francisco  
Presentation of paper re-edited and submitted to and accepted by the SCI 98 and ISAS 98 conferences "Synthetic Sentience as a Strategic Commodity Resource"

Presentation prepared for Alife VI conference - June 25 - 27 1998, UCLA, Los Angeles  
"Aesthetic Potential of Artificial Lifeforms and Synthetic Ecosystems"

Lecture/presentation to the Tesla Society, on the "Theoretical and Applied Aspects Synthetic Sentience as a Strategic Resource" Feb 15, 1998 San Francisco

American Anthropological Association session (CSAS-#127), "Computing the Future of Culture - New Approaches to Understanding Cultural Dynamics" Lecture/presentation in Washington D.C. at the AAAI Computational Anthropology 97 conference, Nov 18 - 20  
"the Virtual Terraform - Beyond the New Event Horizon"

SigGraph 97, Los Angeles,  
Lecture/presentation on the "Aesthetics of Artificial Life in Synthetic Environments"

Lecture/presentation at the Banff Multimedia Institute Dec 6 & 7, 1997 Future Technologies Seminar  
"Synthetic Sentience and the Advent of Virtual Immortality"

Lecture/presentation at the Avatars 97 conference, San Francisco.  
"Aesthetic Exploration in Synthetic Environments - Experiential Artforms"

Paradox Seminar 97, Arcosanti, Arizona, lecture in a panel on the topic of "Synthetic Sentience, Biochips, and Nanotechnology".

Paper submitted to and accepted by the EMCSR '96 - 13th European Meeting on Cybernetics and Systems Research EMCSR'96, Vienna, April 9-12, 1996  
"the Internet as an Organism"

Paper/lecture presented to the Contact Consortium 96  
- CONTACT XIII Conference, March 7-10, 1996  
"Object Oriented Organelles, Synthetic Organisms Flourishing in Synthetic Environments"

Presentation given at the Franklin Institute, Philadelphia, PA - 50 year anniversary of the Eniac  
"Aesthetic Exploration of Alternative Nature on the Virtual Terraform"

An edited version of the chapters on Nanotechnology – the Next Revolution, originally published in the book Cyberlife (see reference above) is currently posted as a featured article series in the MSNBC online publication "Inside", at  
[http://web.archive.org/web/19980421135028/http://www.21net.com/content/inside\\_se/nano.htm](http://web.archive.org/web/19980421135028/http://www.21net.com/content/inside_se/nano.htm)

**This is a brief overview/position statement of the content and thematic trajectory of the material presented at the Paradox Seminar, Arcosanti:**

---

## **Nanotechnology - the Next Revolution**

**Charles Ostman**

In the simplest possible terms, nanotechnology is the enterprise of manipulating, assembling, and constructing, with atoms and molecules, molecular structures, materials, and complete "objects". These can include, but is by no means limited to, such examples as organic or quasi-organic molecular structures, molecular "machines", computing systems with the functional capacity of "supercomputers" but are literally invisible to the human eye, and ultimately, the ability to "replicate" almost any material or macro-object at will.

It is at this point that a state of "god-like" proportions is within the grasp of the human population, or at least some portion thereof who are allowed access to this ultimate tool of creation. How this "technology" threshold will be managed, deployed, and implemented upon the population at large, and the socio-economic and even cultural implications manifest by the advent of this ultimate event horizon of the near future, is the real question that this entire genre of activity and dynamic processes is leading up to.

### **Presentation materials:**

**Dynamic and passive volumetric renderings of various nano-realms, including biomolecular component systems, self assembling and self assembling psuedomorphs, quasi-viral components, "nano-swarm" entities, xenomorphic organelle components and species subsystems, substrate interface and organizational "containment" manifolds, and related nano environments, as visual and behavioral metaphors of these environments, and their related components.**

---

**As presented for the 50 year anniversary of the Eniac computer, at the Franklin Institute:**

### **Aesthetic Exploration of Alternative Nature on the Virtual Terraform - Charles Ostman**

I visualize a world in which the aesthetic and behavioral attributes encountered on the *virtual terraform*, in whatever domain or environment may be represented therein, is not confined to merely a recreation of common humanoid related environments or participants. Indeed, the very essence of access to virtual environments represents the potential for encountering experiences, lifeforms, and aesthetic content not possibly accessible via any other means.

Just as there is aesthetic content to be discovered and observed in the nature of the real world, there is also unlimited potential aesthetic content in the *alternative nature of virtual worlds*. The creation of virtual worlds, or for that matter, virtual universes, can encompass any range of spatial or temporal domains, ranging from the infinitely immense, such as a model of the known universe, to the atomic and molecular scale of theoretical *nanoworlds*.

By defining the dynamic rules and operational processes inherent in the *alternative nature of a virtual world*, this allows access to realms, environments, and experiential domains not possible via any other mechanism. Virtually all forms, textures, and surfaces, such as branching structures of trees, the construction of a leaf or flower, distribution patterns of stars in the core of a galaxy, or pebbles on a beach, even the wispy forms of a cloud, are forms which can be defined and replicated with a series of formulae and procedures that represent the features of those structures.

There is a vast potential in creating synthetic environments, which contain the dynamic elements of evolving organisms, procedurally defined terraforms, and other processes which mimic the behaviors of events and processes observed in the nature of the "real" world.

In this way, the computer can be utilized as form of *computational camera*, to discover the potentially infinite variety of aesthetic content residing and flourishing in the nature of the virtual world. This mechanism enables the exploration of "impossible" virtual worlds, ranging from chaotic events that defy the ordinary rules of nature, to the evolution of silicon based lifeforms existing on an alien terrain.

This is the real power of the computer as a tool for aesthetic discovery and exploration, to be able to mimic the forces and processes of nature to create structures, forms, and textures, as a process, as they occur (or don't occur) in nature. Once defined, these processes can be utilized to create complete synthetic environments within the virtual universe which resides in the computer's memory.

---

## Summary

*It is of personal interest of the author to utilize the combination of various media tools, including 3D visualization, interactive media, and various media technologies to "bring to life" to a general audience subject matter that would otherwise remain obscure, or unknown. The educational potential of such applied technologies is vast, and whenever possible, the author has a particular interest in fulfilling this type of application.*

## Addendum:

Aside from publications, I have been featured on a number of broadcast television and radio programs such as the program SpringBoard (PBS television) and as a guest on the nationally syndicated Art Bell radio (average listening audience 12 - 15 million nightly) program five times.

visit the Art Bell website at <http://www.artbell.com>  
go to "previous guests", and link to the letter "O", for ostman

An example of an interview on the topic of neural prosthetics, for instance, appears in the Discovery Channel online, at  
<http://www.discovery.com/area/technology/virtualtech/issue1/manmachine.html>

## Charles Ostman

tel 510 549 0129 fax 810 821 7218 email [charles000@aol.com](mailto:charles000@aol.com)  
URL <http://www.technofutures.com/charles1.htm>

\*\*\*\* At the Forefront of Evolving Technologies \*\*\*\*

"What appears to be the future for some, is already the past  
for others, who are unfolding it into the present" C. Ostman\_