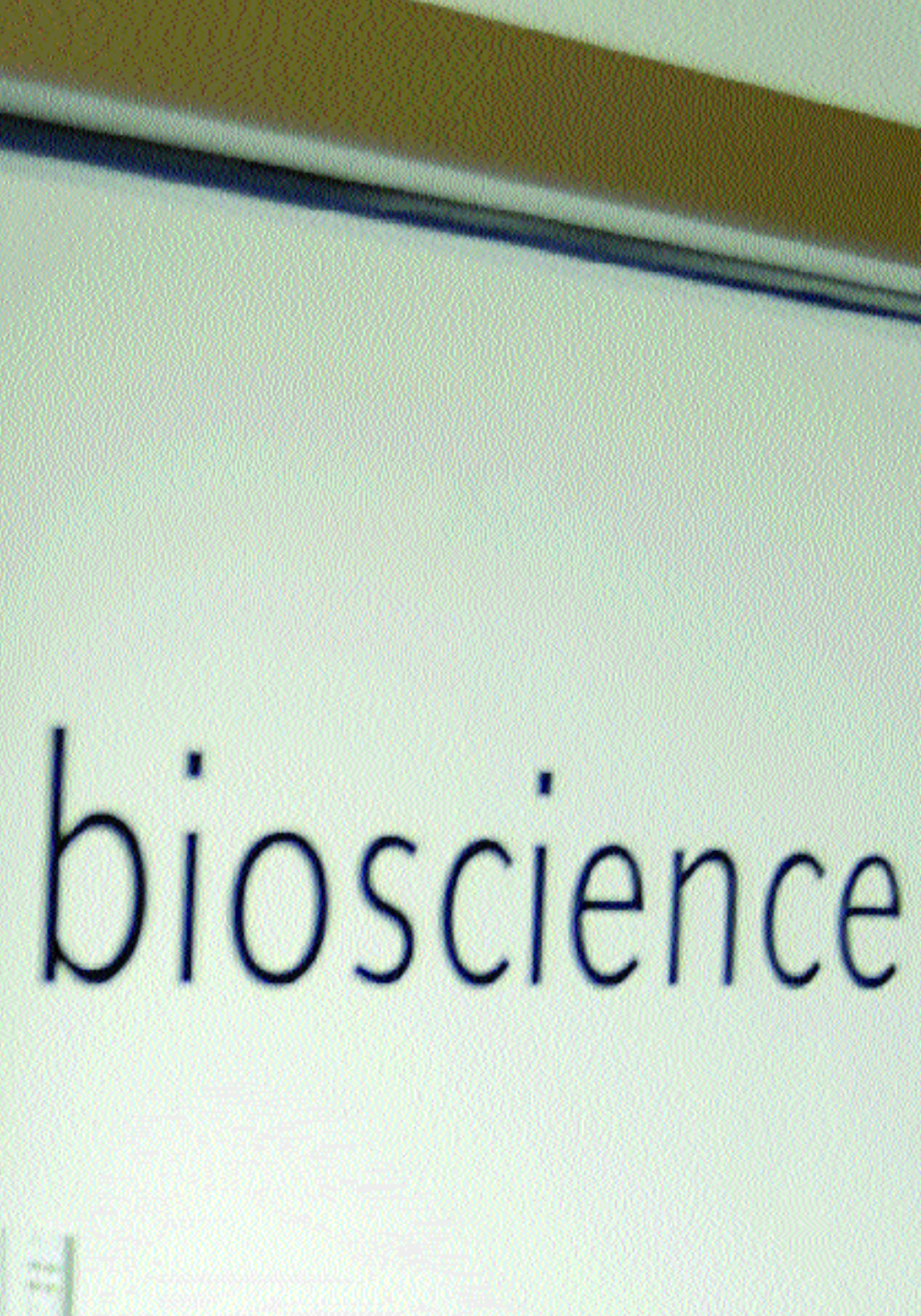




LION



bioscience

## Destined for Science

As one of the new breed of 40-something business leaders, **Joseph F. Donahue** is bringing a multidiscipline skill set to help LION bioscience become the leader in improving research productivity within the life-sciences industry.

BY KIM RIBBINK



**R**esearching and finding solutions for the life-sciences industry, through an amalgam of pure science and technology, takes dedication, knowledge, and imagination. To then take that bioinformatics and data-gathering expertise and turn these talents into truly effective customer relations and partnerships requires energy, enthusiasm, and innate people skills.

Joseph Donahue, president of LION bioscience Inc., has managed to combine a penchant for science and technology, a result of his own capabilities and familial experiences, with a gift for listening and problem-solving. These combined skills have elevated him from the lab to the executive level, and he is a natural choice to lead a life-sciences informatics company. In May 2003, Mr. Donahue was appointed president to lead the North American operations of the German-based LION bioscience AG, which provides software solutions for pharma and biotech companies to improve the drug-discovery process.

“One of the reasons I focused on the informatics side of the business was the marriage of chemistry and computers; this is an area where I felt I could make an impact,” he says.

LION’s mission is to improve the research productivity of the life-sciences industry. The company does this by providing information-technology (IT) solutions that address some of the key challenges in the research process.

Central to ensuring these solutions accomplish their objectives is to have IT experts, scientists, and process specialists work closely in cross-functional teams.

“There are two components to the solutions that LION offers: technology and services,” Mr. Donahue says. This is an approach that he has seen work in other companies. Above all, it is an outlook that is intrinsic to the way Mr. Donahue works and the choices he has made throughout his career.

### Ties that Bind

With both parents working in chemistry, Mr. Donahue was more or less destined to incorporate science into his career.

“It’s hard for me to know whether chemistry was an interest I’d always had or whether it was because I was around chemistry so much,” he says.

His mother has a master’s degree in organic chemistry, with a chemical engineering background; she was one of the first employees hired by Eugene Garfield, Ph.D., at the Philadelphia-based Institute for Scientific Information (ISI). She spent 20 years of her career at ISI before joining Merck & Co.

Mr. Donahue’s father, a chemical engineer, worked in various positions at Merck, Beecham Laboratories, and SmithKline Beecham. His work took him and his family to Ireland. During this time, Mr. Donahue was exposed to the field that became his second great interest — computer technology. He became particularly interested in the opportunities that technology could bring to the pharmaceutical industry in terms of improving processes.

“My father was sent by Merck to Ireland to set up, what was at the time, the most computerized pharmaceutical chemical manufacturing plant in Ireland and the most sophisticated plant Merck had anywhere in the world,” the LION executive explains. “I spent a lot of time with my dad walking around the plant as

## Inspiration and Challenges

**IN AN EXCLUSIVE INTERVIEW WITH PHARMAVOICE, JOSEPH F. DONAHUE, PRESIDENT OF LION BIOSCIENCE INC., TALKS ABOUT THE THRILLS AND CHALLENGES OF THE PHARMACEUTICAL INDUSTRY, HIS CAREER SUCCESSES AND ASPIRATIONS, AND THE PEOPLE WHO HAVE INSPIRED HIM.**

**WHAT IS IT ABOUT THE LIFE-SCIENCES INDUSTRY THAT YOU FIND INSPIRING, AND CONVERSELY WHAT DO YOU CONSIDER TO BE THE INDUSTRY’S BIGGEST CHALLENGES?**

It’s an industry that impacts all of us at some point in our lives. It’s very rewarding to be part of that. But the industry is often under attack from multiple fronts, and it’s important to be sensitive to that. Also, the industry spends a lot of money on the R&D process, and at the same time, a lot of data are generated. The challenge I see is how to take those data and turn them into knowledge. While R&D spending keeps increasing, there hasn’t been the corresponding increase in NDAs (new drug applications) that hopefully become new drugs. One of the real challenges is to determine how to change that. Can we get R&D spending down and then increase the number of new drugs that are discovered? Technology that companies such as LION develops is part of the solution. Technology is not going to replace the underlying science but it’s going to help.

**YOU HAVE PROGRESSED RAPIDLY IN YOUR CAREER. TO WHAT DO YOU ATTRIBUTE THAT AND WHAT LEGACY WOULD YOU HOPE TO LEAVE AT THE COMPANIES YOU’VE WORKED AT?**

I would hope that my career success has something to do with the



JOSEPH DONAHUE

results I achieve. That’s how I’ve helped companies grow, how I’ve helped people grow, and how I’ve helped their relationship with their customers grow. I hope my legacy will be an adoption of a focus on the customers and the sales organization. This means working with customers in a partnership.

**WHO ARE SOME OF THE PEOPLE WHO HAVE INSPIRED YOU?**

There are three people who come to mind. The first is Steve Goldby,

it was being built. I had the chance to understand how pharmaceuticals were being manufactured and how, through computerized operations, the processes were improved. It was a bit like Star Trek — being in the control room with all the lights, seeing how a company could monitor and control a manufacturing process automatically. It was exciting stuff.”

Mr. Donahue attributes his years in Ireland to opening his mind to different cultural perspectives, something he considers critical for an industry with a global presence.

Mr. Donahue headed to Villanova University, his father's alma mater, initially to study chemical engineering. But he soon recognized that this degree wasn't going to give him the mix of chemistry and computers he had hoped for. So he switched to a joint degree in chemistry and computer science.

Before graduating, he joined the BOC Group, which was looking to set up a CADD lab at its Murray Hill facilities in New Jersey.

“I worked on getting the computers in for the BOC Group, setting up that lab, and working closely with some of the people in the group,” he says. “Then they hired me as a consultant when I

who was CEO of MDL during my time there and is now CEO of Symyx Technologies. He's a phenomenal strategist, who influenced me in terms of working with customers and building strategic partnerships with customers.

Another person would be Tom Jones, who ran MDL's sales organization. Being an ex-Marine he had a unique style about him, and sometimes I didn't understand why he made the decisions that he made. But now, after many years and having had much more experience, I can understand why he made those decisions. He had an incredible focus on operational issues, in working with customers, and how to build a great customer-facing sales and marketing organization. He was probably the best person I ever worked with in that respect.

The third person is my dad, also Joseph Donahue, in terms of absolute perseverance and always doing the right thing. These are two traits he taught me that I'll never forget.

returned to college under the promise that I would come back when I graduated.”

Mr. Donahue says the job was split between working in the lab as a medicinal chemist and providing computer support in the CADD lab. The all-encompassing approach Mr. Donahue takes to problem solving began, to some extent, at BOC.

“The therapeutic teams weren't just working on the targets; we also were involved in trying to understand what business to go after, what market we should go after, and doing basic marketing research to justify the projects we wanted to work on,” he says.

## The Right Byte

After a year at BOC, Mr. Donahue took a position at what was then Molecular Designs Ltd., now MDL Information Systems, as a field application support scientist. The appeal for Mr. Donahue was an opportunity to work more closely in the application of computer technology for the pharmaceutical process, which is where his greatest interest increasingly lay. Furthermore, he was well-acquainted with MDL's solutions, since BOC made use of MDL's expertise in CADD and reaction synthesis planning systems.

For Mr. Donahue, perhaps most critical was the opportunity to interact with customers. “It was a great mix of working with customers to help them understand the research process, getting into the science with them, and helping them to translate that science to how informatics systems could help them,” he says.

Realizing how much he enjoyed working with the customers, Mr. Donahue decided he would be well-suited to pursuing a career on the sales side. That took some convincing since MDL's head of sales Tom Jones, a man Mr. Donahue counts as one of his greatest sources of inspiration, was somewhat hesitant to put a researcher in sales.

But after much persuasion, Mr. Jones decided to give the young scientist a shot. Mr. Donahue was given a tough challenge — starting in a geographic territory that had no customers and having to figure out how to develop a market from scratch. Having proved his mettle, his responsibilities within the MDL sales organization gradually increased until he was running the American sales operations.

The 15 years at MDL were formative in establishing Mr. Donahue's interests and talents. Furthermore, he had an opportunity to watch a strong management team successfully lead a company out of a potentially inflammatory situation.

One of the reasons I focused on the informatics side of the business was the marriage of chemistry and computers; this is an area where I felt I could make an impact.

MDL had been acquired in 1987 by Robert Maxwell's conglomerate Maxwell Communications. After this company's demise, MDL executives petitioned the bankruptcy court in the United Kingdom to allow it to go public, which it did in 1993. MDL was then publicly traded on the Nasdaq stock market as MDL Information Systems Inc.

“The senior-management team, especially the CEO Steven Goldby, did a phenomenal job extracting MDL from that situation,” Mr. Donahue says. “The company underwent an IPO on the Nasdaq and it continued to be a very successful company.”

The company was acquired by Reed Elsevier in 1997. MDL remains part of the scientific and medical division of Reed Elsevier. As the company grew in size and many of the people on the senior-management team moved on, Mr. Donahue decided it was time for a change.

Spotfire, which had worked with MDL extensively — MDL was Spotfire's exclusive worldwide distributor in the life sciences — became aware that Mr. Donahue was considering a change and offered him the position of VP of sales and marketing, leading the teams in the life-sciences and chemicals vertical markets across global scientific supply chains.

“For me, part of the attraction to Spotfire was I enjoyed working with a smaller company and helping build the business,” he explains. “I also had an objective — I wanted to learn more about the way private organizations operated from a financial standpoint. Getting in on the ground floor of a young, growing business was something that attracted me.”

During Mr. Donahue's time at Spotfire, he looked at opportunities for expanding the company's customer base in the life-sciences and chemical industries. Spotfire provides decision-support tools for several major industries, and its analytical tool enables users to look at data in multiple dimensions, as opposed to a program such as Excel that shows data one row at a time.

## Customer Centric

The areas where Mr. Donahue believes he has had the greatest impact at both MDL and at Spotfire are in how he has positively impacted the people at those companies and how he helped the companies interact with their customers. At MDL, he says, he learned how critical it was for an organization to look at the big picture and understand the challenges faced by the customer.

“That means understanding not only the

concerns of the VP of R&D or the VP of medical chemistry, but knowing the details from all sides, understanding what worries the people in the trenches have and which tools can help them," he explains.

The experience taught him how critical it was for a leader to set the company's vision,

empower staff to make a decision, and to have people focused on the fundamentals.

"I have an obligation to the people in the organization, their families and significant others, our customers, and our investors," Mr. Donahue says. "I have an obligation to make sure we look after those people and that we



## The LION Solutions

**L**ION bioscience's products aim to improve the quality of targets and leads by providing rapid access to all data and best-of-breed applications and prediction tools. The company's solutions consist of software components and professional services to solve issues within the drug-discovery process. It offers a scalable, adaptable, and supportable IT platform and processes to reduce time to market in drug discovery. These solutions include:

### SRS EVOLUTION

SRS Evolution provides a package of products that deliver all the functionality needed by target identification and validation departments. SRS Evolution is a bioinformatics platform into which all internal, external, and third-party data can be seamlessly integrated with the standard bioinformatics analysis tools.

Data can be queried, connected, and combined together to enable scientists to fully exploit and understand the value of internally generated data regardless of format. This ensures that target identification and validation research can be effectively carried out from a single tool and no relevant data is omitted from the decision-making process.

SRS Evolution is a package comprising the following components:

- SRS 7.1: a data integration system
- SRS Relational: provides access to relational data
- SRS 3D: for integration and display of 3D protein structures
- SRS PRISMA: for automated download and formatting of data
- SRS Objects: APIs for software developers

- Trainings: for user and administrator training
- Support and professional services

### LION DISCOVERYCENTER

The LION DiscoveryCenter is designed to provide a single point of access to all life-sciences data, covering the entire drug-discovery process. Solutions built on the technology of LION DiscoveryCenter integrate life-sciences data, applications, and decision support tools in a user-friendly desktop interface and form a scalable drug-discovery decision platform.

It is a software environment that provides an integrated view of chemical and biological information held in both internal and external repositories.

It builds and presents cogent representations of relationships between biological and chemical data, which improves the quality of research. The user gains context-sensitive information, so the right decisions can be made more quickly.

LION DiscoveryCenter facilitates collaboration to support teams working together and increases productivity.

### LION TARGET ENGINE

LION Target Engine is a fully scalable and adaptable solution, which delivers *in silico* support for target identification and validation, extendable to cover the entire drug-discovery process.

LION Target Engine is based on LION DiscoveryCenter, complemented by a broad range of optional components. Each component has specific functionalities essential for target identification and validation. A centralized Gene Hub allows the interconnection of all data in the system. The product's functionalities include:

- Central data unifying gene hub

- Annotation of nucleic acid and protein sequences
- Pathway and protein-protein interactions interpretation
- Genome analysis
- Experimental results visualization
- Text mining
- Protein structure analysis
- Sequence registration
- APIs to extend third-party and legacy tools

### LION LEAD ENGINE

The LION Lead Engine is a software solution in the area of cheminformatics, supporting processes in lead identification and lead optimization.

LION Lead Engine provides a fully integrated cheminformatics desktop built on LION DiscoveryCenter architecture for expert and nonexpert users in large pharma. Functionality includes:

- Data integration (parallel access to compound databases under Oracle)
- Standard chemical structure searching capabilities on databases
- Property searching capabilities
- Similarity searching capabilities
- Visualization capabilities (spreadsheet, export to third party, etc.)
- Access to chemical compute services
- Integration of LION's iDEA ADME prediction service

have a viable business to support those people. A business can't grow without people, and it certainly can't grow without customers."

Mr. Donahue has brought that perspective into his position at LION.

"It is critical to build a strong customer-focused organization, and that's on multiple

levels," he notes. "For the scientists, the technical informatics people, and the account representatives who work with customers on a regular basis, the focus must be to, firstly, make sure that customers' current solutions continue to work as adver-



## Business through Partnerships

### **BAYER AG**

LION and Bayer entered into a five-year alliance in 1999. Under the alliance, which is largely based on the formation of a new research subsidiary, LION has been developing and applying new IT systems for ultra high-throughput identification and validation of new drug targets, gene expression markers, and single nucleotide polymorphisms (SNPs).

### **CELERA**

The two companies have entered into a strategic alliance to develop and deliver software tools through the Celera Discovery System, a Web-based portal through which a variety of customers access Celera's databases and analysis tools. In addition, Celera will offer LION's automated genome annotation, comparison, and expression analysis tools, bioScout, genomeScout, and arrayScout, through the CDS.

### **THE GERMAN CANCER RESEARCH CENTER (DKFZ)**

LION has entered into an agreement with the DKFZ for exclusive access to DNA-array technology developed by Dr. Jörg Hoheisel and bioinformatics software developed by Dr. Martin Vingron.

### **ELECTRIC GENETICS**

LION bioscience has formed a collaboration with Electric Genetics (Cape Town, South Africa) in the fields of transcriptome and expression variation analysis. LION uses Electric Genetics' well-established stackPACK EST-clustering and analysis tool to develop software for accelerated gene discovery and annotation.

### **THE EUROPEAN MOLECULAR BIOLOGY LABORATORY (EMBL) AND THE EUROPEAN BIOINFORMATICS INSTITUTE (EBI)**

LION has exclusive technology transfer agreements with the EMBL, the mother institute of both LION and the SRS system, for SRS and further bioinformatics software.

### **GENEPROT**

LION bioscience AG and GeneProt Inc. have entered into a three-year strategic alliance and marketing collaboration. The two companies will comarket their joint solutions in the proteomics area enabling customers to integrate their data across different disciplines.

### **IBM**

The strategic alliance between IBM and LION bioscience combines technologies for scientific data analysis, management, and integration with a powerful information technology infrastructure and implementation services. Based on the combined technologies and services, the two companies can offer a one-stop enterprisewide solution.

### **MDL**

LION and MDL Information Systems Inc., a leader in discovery informatics for the life-sciences and chemistry industry and academia, have entered into software licensing and reselling agreements. LION will license a wide range of MDL's industry-standard informatics applications and databases in order to develop and commercialize software applications that can interface with MDL's widely deployed products.

### **PARACEL**

LION has signed an agreement for GeneMatch-

er, a genetic data analysis system from Paracel Inc. LION uses the system in genetic sequence characterization as a component of a high-throughput alert system for identifying novel target genes.

### **PARADIGM GENETICS INC.**

LION entered into an alliance with Paradigm Genetics to develop new products and to identify targets for crop production, nutrition, and human health. This partnership is initially concentrating on developing informatics tools for metabolic profiling to predict changes in biochemical pathways, as well as phenotypic analysis tools to predict and analyze gene function.

### **SCHERING AG**

In April 2003, LION bioscience AG announced a six-year global licensing deal with Schering AG for LION DiscoveryCenter. Schering plans to deploy the platform for the establishment of its enterprisewide target validation platform.

### **SGI**

sgi provides LION bioscience with hardware for LION's Life Science Informatics and Genomics Research and has a collaboration agreement with LION.

tised. Secondly, we must work with customers so they understand where the company is going from a strategic standpoint and that our future developments are in line with the objectives and challenges they face. Then, as a company, we have to be more proactive in talking to customers about the directions in which we'll be taking new solutions."

To do that, LION has narrowed its focus. Over the past year, the company has closed its drug-discovery unit and discontinued some of its IT products.

The company's focus also has shifted to developing a modular data and application integration platform, further developing its professional services, and continuing to focus on marketing and developing its SRS, sequence retrieval system, products.

Mr. Donahue says the difficulty for the company was to both potentially compete with customers on the drug-discovery side, as well as offer them solutions to help in their drug-discovery efforts.

"LION is focused on the right aspect of the business, which is life-sciences informatics," he says.

## Retrieval and Delivery

LION was founded in March 1997 by a group of molecular biologists and bioinformaticians from Heidelberg's world-renowned research institutions, including the European Molecular Biology Laboratory (EMBL), the German Cancer Research Center, and the University of Heidelberg.

The company combines its scientific and IT expertise to develop innovative integration and knowledge-management solutions aimed at radically streamlining drug-discovery processes to save time and money. That expertise derives from LION's former drug-discovery business as well as from major integration

and knowledge management collaborations with companies such as Bayer AG, Schering AG, and others. (For more information, see box on page 68.)

The company came to the forefront with its SRS bioinformatics platform. SRS provides the bioinformatics backbone for more than 200 commercial and academic institutions, including many of the world's major pharmaceutical companies. SRS Evolution is a bioin-

Mr. Donahue attributes his years in Ireland to opening his mind to different cultural perspectives, a view he considers critical for the pharmaceutical industry with its global presence.

## A Multidimensional Approach

### JOSEPH DONAHUE — RESUME

**MAY 2003 — PRESENT.** President, LION bioscience Inc., Cambridge, Mass. Responsible for leading LION's North American operations and providing guidance to the company's worldwide sales and business operations.

**APRIL 2000 — SEPTEMBER 2002.** VP, sales and marketing, life sciences and chemical, Spotfire Inc., Somerville, Mass. Responsible for leadership of worldwide sales and marketing groups in life sciences and chemicals vertical markets across global scientific supply chains.

**JUNE 1998 — APRIL 2000.** VP, North American sales, MDL Information Systems/Beilstein Information Systems, San Leandro, Calif.

**FEBRUARY 1996 — JUNE 1998.** Regional sales director and manager, MDL Information Systems/Beilstein Information Systems, San Leandro, Calif.

**NOVEMBER 1991 — JANUARY 1996.** Regional senior and strategic account manager, MDL Information Systems/Beilstein Information Systems, San Leandro, Calif.

**SEPTEMBER 1988 — OCTOBER 1991.** Account manager, MDL Information Systems/Beilstein Information Systems, San Leandro, Calif.

**AUGUST 1986 — SEPTEMBER 1988.** Field application support scientist, MDL Information Systems/Beilstein Information Systems, San Leandro, Calif.

**JUNE 1985 — JULY 1986.** Research Chemist, The BOC Group Inc., Murray Hill, N.J.

### EDUCATION

**1985.** B.S. in chemistry and computer science, Villanova University

formatics platform into which all internal, external, and third-party data can be seamlessly integrated with the standard bioinformatics analysis tools. This platform enables the user to query all relevant data from a single user interface and launch any analysis tool without the need to cut and paste data between separate interfaces.

LION has since extended its information integration expertise with LION DiscoveryCenter, a modular platform providing seamless integration of biological and chemical data and applications so that researchers can make smarter decisions faster.

The company recently announced the launch of LION Target Engine, a solution for identifying and validating targets. In June, LION announced that Siena Biotech, an Italian biomedical company, had become the first customer for LION Target Engine.

Another new LION offering is the LION Lead Engine, which identifies, categorizes, and optimizes leads in the chemical phase. (For more information, see box on page 66.)

What sets the company apart from others in the field, Mr. Donahue says, is its approach to business.

"Rather than coming at business from the approach of programming and prototyping a product and then trying to figure out how the company can sell a solution, LION works closely with customers in a partnership to develop products."

One such partnership is with Bayer AG. In June 1999, LION and Bayer entered into a five-year, \$100 million alliance to increase the speed and efficiency of Bayer's enterprisewide gene and drug-discovery efforts through the use of an information technology-based management system.

Under the alliance, LION is developing and applying new IT-systems for ultra-high throughput identification and validation of 500 new drug targets, 70 new annotations on existing Bayer-owned gene targets, and an undisclosed number of gene expression markers and SNPs. That partnership has since been expanded. (For more information, see box on page 68.)

"The relationship with Bayer is a perfect example of how the company did informatics outsourcing for bio sites worldwide and then turned the solutions into organically developed products that can be marketed to other customers," Mr. Donahue says. "Bayer has been able to use some of the systems we've developed on an exclusive basis. This is technology that we own and that we can commercialize ourselves after one year. And LION has the advantage of marketing products that have been field tested." ♦

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