

CASE STUDY

ScienceDirect



LEVERAGING GLOBAL SCIENTIFIC DEVELOPMENTS TO SPUR CHEMICAL INNOVATION



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Gordon* has spent more than 10 years as an industrial scientist in various petrochemical and chemical companies. He currently works for one of the 50 largest chemical companies in the world with global sales above \$25 billion. Working at the forefront of commercial technology development has led him on a path of improving existing and developing disruptive technologies—and some of that work has been published in ScienceDirect Journals.

“When I started as an industrial scientist I was really enthusiastic about science and research,” he says. “I’ve never lost that enthusiasm; there is simply too much fun in working on new things, and what is better than doing that in an environment where there’s always an eye for application? So transforming ideas into practical solutions, that’s my work.”

*For confidentiality purposes, names have been changed.

Gordon’s personal drive for sustainable technology keeps him focused on the intersection of industrial and academic catalysis. He is convinced that open innovation concepts are necessary to move great ideas towards implementation.

He has always worked at companies with a keen focus on identifying and prioritizing key areas for research and development. “This has to do with the great challenges of the world, like feeding all people on this planet without sacrificing too much of the environment. It’s about developing the undeveloped world, it’s about energy and transportation and making that possible when resources deplete. To achieve all of that requires thinking about resource efficiency and long-term sustainability, and that’s where my work comes in,” he says.

“To find out if it’s novel or not, you need to screen the prior art. You want to see what the state-of-the-art is and what other people do, to make sure that you find where the gaps are and where the solutions can be developed.”

Gordon, Ph.D.
Industrial scientist, ScienceDirect user

Finding the next great idea: the currency of innovation

Gordon strives toward sustainability, both with regard to a carbon footprint and to securing his company’s business in the long-term. A key challenge of his work is sustainable feedstock research - exploring new technology that can effectively replace processes based on materials derived from oil. Overcoming this challenge is a continual process of keeping up with promising leads across industries and exploring possible solutions and opportunities on which to build. By using ScienceDirect to review journals and track citations, he stays on the forefront of new avenues of thinking.

“What if there is no more oil and you cannot use that as feedstock for the industry? Can we use biomass, or can we use other sources of carbon? Can we use waste and how to turn that into products with the same properties of what we make today?” he asks. “There’s a big part of my industry working on how we can make the new resources into products that have the same functionality as what we have now or even better,” he says.

Gordon’s work in multidisciplinary Research & Development teams has spanned both small development projects that check on new ideas, and larger, established initiatives with extensive teams of scientists working in the field to bring the most interesting options closer to commercialization.

“I’m actively involved, so I’m in early stage idea development, shaping projects, but I’m also leading large projects with an extensive global team that tries to develop novel disruptive technology,” he explains.

Particularly for the early-stage investigations, Gordon’s teams must reach consensus on the viability of a potential new product initiative in terms of its uniqueness, the degree to which it’s inventive, and strength of industrial application. Literature review via resources like ScienceDirect is particularly helpful in quickly evaluating the novelty of a new idea.

“To find out if it’s novel or not, you need to screen the prior art. And usually you have to be fast, because it’s about being the first to file,” he says. “This type of assessment is happening on a frequent basis.”

He explains how this assessment drives toward achieving company goals: “You can learn a lot from what others have done, sometimes in completely different areas, and you can translate it to your own practice. You also can learn more in areas that are pretty crowded and where a lot of people are active and you want to see what the state-of-the-art is and what other people do, to make sure that you find where the gaps are and where the solutions can be developed,” he says.

“Quick access and a fast database means that if I want to search for something, I know that I can find it in a couple of minutes, and it’s not an hour exercise to get one single paper... it saves me maybe 75% of the time that I spent in the past.”

Gordon, Ph.D.
Industrial scientist, ScienceDirect user

ScienceDirect is a conduit to the latest thinking for idea generation

In approaching his work, Gordon consistently keeps up with what’s going on in various industries and science circles, which helps augment the thinking of the Research & Development teams with fresh ideas.

Everything starts with ideas, and the best way to capture and develop ideas is to observe and explore leading-edge science. Particularly for investigating new potential uses of technology, ScienceDirect helps Gordon stay current and be exposed to potentially relevant developments in industries other than his own. He receives regular alerts of new research in about 25 journals and spends roughly half of a day every week scanning the alerts and reading articles that look promising. Lately, he has found ScienceDirect journals such as Fuel to be strong resources for ideas around the topic of natural gas conversion.

“So that’s where ScienceDirect comes in for me, because I follow a large number of tables of content of relevant journals where people publish their work. Based on that, I try to translate it and think about if this chemistry works for molecules A and B, what happens if you do it for our target molecules? Or if this learning is taking from this or that paper what does it mean for my project? If you want to have a broad feel on what’s happening in the outside world, you don’t focus on just your own project; you look beyond the borders of what you’re doing currently, sometimes even beyond your own industry. And that typically results in idea generation.”

ScienceDirect optimizes scientists’ time with instant access to a comprehensive database and proactive notification of new research

Gordon values the breadth of ScienceDirect’s content, which not only gives him access to particular journals, but also the ability to link through to cross-references of other relevant work and research cited in the article.

“ScienceDirect is one of the most complete offerings. It’s not only a few journals, it’s a range of journals that are interesting. All the cross references to other work help me to quickly assess the state of the art. You can immediately scan related documents that are in the same area and every time you can collect a number of relevant references that you can use for yourself to shape the idea you have,” he says. “Also, there are certain topical journals in ScienceDirect where you can read conference proceedings and see, without going to the conference, what kind of work was presented.”

The pace of work and experimentation has increased exponentially in the recent past, Gordon says. In the last 10 years, for example, scientists have gone from one to dozens of experiments per week with the help of high-throughput experimentation. In addition, computational chemistry has grown up to an established asset for development. The ability to conduct all of this research seamlessly from the desktop saves time and meets the need to quickly identify and act on promising ideas. Gordon finds ScienceDirect’s utility and search flexibility superior to other resources in this regard.

“We can save a lot of experiments by knowing what others did and what their conclusions are... and that’s where Elsevier’s ScienceDirect comes in. If I didn’t have access to ScienceDirect, I think I would feel incomplete in doing my work.”

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“The ScienceDirect interface is among the best. I have limited resources; I cannot afford to spend most of my time on literature. In just a few minutes on ScienceDirect, I can access a historical list of developments in that field. Do I see opportunities to solve a problem that cannot be solved at the moment by others or do I think it’s a dead-end and the road is not getting further?”

With today’s competitive pace of discovery, being able to reduce the time to get to decision points is a crucial benefit. Using ScienceDirect to target his searches allows Gordon to quickly identify priorities and avoid unnecessary or costly experimentation in early stage development. This has proven vital to his success and efficiency.

“Having quick access and a fast database means that if I want to search for something, I know that I can find it in a couple of minutes, and it’s not an hour exercise to get one single paper or one answer... I can do the same work in much less time because of electronic access. I would say that it saves me maybe 75% of the time that I spent in the past.”

Exploring the latest literature in ScienceDirect mitigates R&D risks and helps manage project development costs

A big risk in cutting-edge scientific development is developing a solution that might already exist. Literature review not only helps scientists determine if there is a viable solution; it helps them to hone the specific questions they need to answer.

“We can mitigate risk. If you identify the right questions you can find the right answers or, if the answer is not there, you can shape your R&D to find the answers you need in order to avoid that risk,” Gordon says.

The literature review process can also help reduce risk by prioritizing resources for costly experimentation based on work that has previously been done, which in turn facilitates progress toward unique, successful new products.

“We can save a lot of experiments by knowing what others did and what their conclusions are. The first thing we do is look outside before we start doing it inside, and that’s where Elsevier’s ScienceDirect comes in,” Gordon says. “If I didn’t have access to ScienceDirect, I think I would feel incomplete in doing my work. Science is becoming more experimental than information digestion. In this global world organization, everybody shares things, and people in Asia, in South America, wherever, are also doing a great job in getting information that you need to make decisions. I would say that without that, we would be a very internally-focused organization and doing a lot of unnecessary work in fields where others might have done a much better job already.”