Spotfire™

Revolutionising Industry Visual Analytics

DIGITAL REPORT 2024

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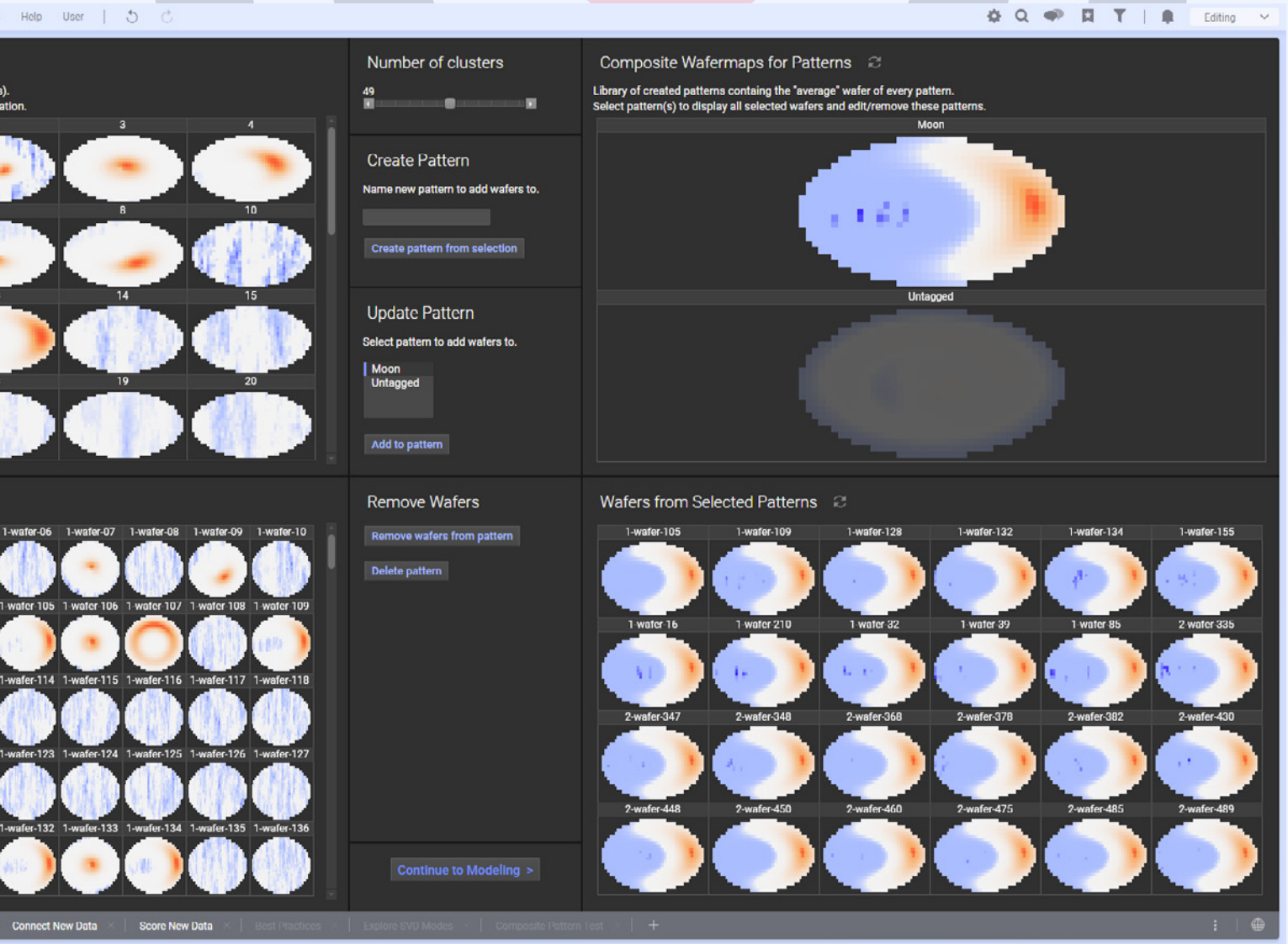

Help
User
Editing
Number of clusters
49
Create Pattern
Name new pattern to add wafers to.
Create pattern from selection
Update Pattern
Select pattern to add wafers to.
Moon
Untagged
Add to pattern
Composite Wafermaps for Patterns
Library of created patterns containg the "average" wafer of every pattern.
Select pattern(s) to display all selected wafers and edit/remove these patterns.
Moon
Untagged
Remove Wafers
Remove wafers from pattern
Delete pattern
Continue to Modeling >
Wafers from Selected Patterns
1-wafer-105
1-wafer-109
1-wafer-128
1-wafer-132
1-wafer-134
1-wafer-155
1 wafer 16
1 wafer 210
1 wafer 32
1 wafer 39
1 wafer 85
2 wafer 335
2-wafer-347
2-wafer-348
2-wafer-368
2-wafer-378
2-wafer-382
2-wafer-430
2-wafer-448
2-wafer-450
2-wafer-460
2-wafer-475
2-wafer-485
2-wafer-489
Connect New Data
Score New Data
Best Practices
Explore SVD Modes
Composite Pattern Test

Cloud Software Group's Spotfire is transforming data analysis for the energy and manufacturing sectors, offering unique visual data science capabilities

In today's data-driven world, industries are constantly searching for more effective ways to analyse and interpret vast amounts of information. At the forefront of this market is Spotfire, a visual data science platform that "makes smart people smarter".

Spotfire offers unique capabilities that set it apart from traditional data analysis tools in that it combines visual analytics, data science and data wrangling to allow experts to analyse data – at-rest, in-motion and at-scale – so augmenting human creativity and the power of modern computing to solve problems.

Spotfire is part of the Cloud Software Group, an enterprise software organisation. Brad Hopper, VP of Vertical Markets at Cloud Software Group, explains the genesis of Spotfire and its evolution into a powerful tool for various industries.

"Spotfire was founded as part of human computer interaction research at Chalmers University and the University of Maryland," he says.

Spotfire was initially focused on the pharmaceutical research sector. It quickly gained traction among biologists and chemists, until the majority of pharmaceutical companies globally were using it for their research processes.

Brad has spent his career at the forefront of data analytics in manufacturing and energy. He has a background in manufacturing, including degrees from UC Berkeley, and worked at AMD as a process and yield engineer. His journey with Spotfire began in the early days of the company.

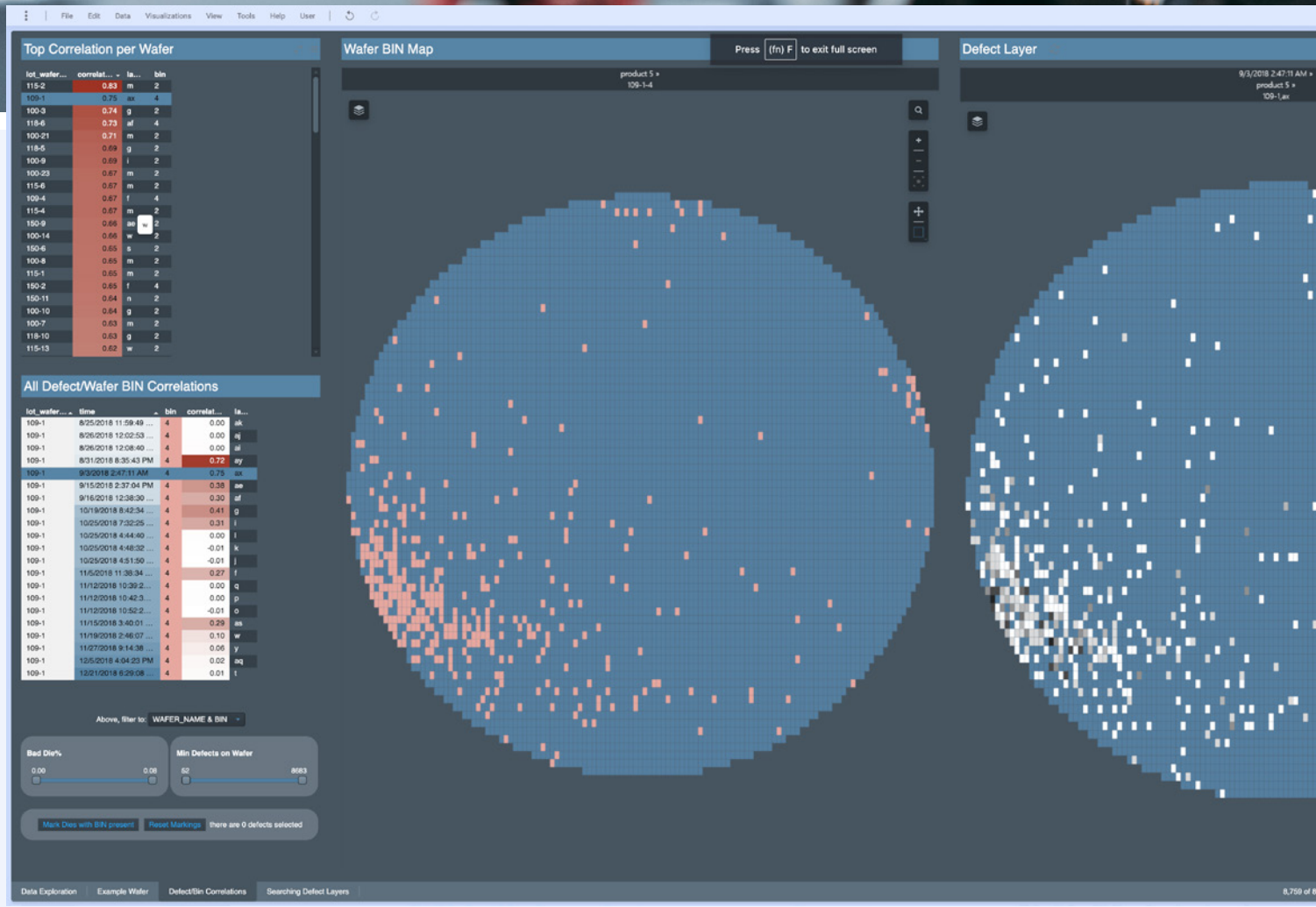
"I joined just a few years after the company started. I was employee number 65," he recalls.

His engineering pedigree and prior experience gave him unique insights into the potential applications of Spotfire's technology and he has helped shape Spotfire's visual analytics technology into a powerful tool for industries ranging from semiconductors to oil and gas.

"The moment I saw Spotfire, I said, 'this is something that really needs to be in the semiconductor business'," Brad explains.

Just 18 months later, seven of the top ten semiconductor companies in the world were using the solution. The company's success in these and other industries was down to its ability to address a significant gap in the market.

"Semiconductors was underserved from a data analytics perspective," Brad says. "They had these super-advanced, super high-powered and very complex vertical applications. Each company


File Edit Data Visualizations View Tools Help User
Top Correlation per Wafer
lot_wafer... correlat... la... bin
115-2 0.83 m 2
109-1 0.75 ax 4
100-3 0.74 g 2
118-6 0.73 af 4
100-21 0.71 m 2
118-5 0.69 g 2
100-9 0.69 i 2
100-23 0.67 m 2
115-6 0.67 m 2
109-4 0.67 f 4
115-4 0.67 m 2
150-9 0.66 ae 2
100-14 0.66 w 2
150-6 0.65 s 2
100-8 0.65 m 2
115-1 0.65 m 2
150-2 0.65 f 4
150-11 0.64 n 2
100-10 0.64 g 2
100-7 0.63 m 2
118-10 0.63 g 2
115-13 0.62 w 2
All Defect/Wafer BIN Correlations
lot_wafer... time bin correlat... la...
109-1 8/25/2018 11:59:49 ... 4 0.00 ak
109-1 8/26/2018 12:02:53 ... 4 0.00 aj
109-1 8/26/2018 12:08:40 ... 4 0.00 ai
109-1 8/31/2018 8:35:43 PM 4 0.72 ay
109-1 9/3/2018 2:47:11 AM 4 0.75 ax
109-1 9/15/2018 2:37:04 PM 4 0.38 ae
109-1 9/16/2018 12:38:30 ... 4 0.30 af
109-1 10/19/2018 8:42:34 ... 4 0.41 g
109-1 10/25/2018 7:32:25 ... 4 0.31 i
109-1 10/25/2018 4:44:40 ... 4 0.00 l
109-1 10/25/2018 4:48:32 ... 4 -0.01 k
109-1 10/25/2018 4:51:50 ... 4 -0.01 j
109-1 11/5/2018 11:38:34 ... 4 0.27 f
109-1 11/12/2018 10:39:2... 4 0.00 q
109-1 11/12/2018 10:42:3... 4 0.00 p
109-1 11/12/2018 10:52:2... 4 -0.01 o
109-1 11/15/2018 3:40:01 ... 4 0.29 as
109-1 11/19/2018 2:46:07 ... 4 0.10 w
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109-1 12/5/2018 4:04:23 PM 4 0.02 aq
109-1 12/21/2018 6:29:08 ... 4 0.01 t
Above, filter to: WAFER_NAME & BIN
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Min Defects on Wafer
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Mark Dies with BIN present
Reset Markings
there are 0 defects selected
Wafer BIN Map
Press (fn) F to exit full screen
product 5 »
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Defect Layer
9/3/2018 2:47:11 AM »
product 5 »
109-1,ax
Data Exploration
Example Wafer
Defect/Bin Correlations
Searching Defect Layers
8,759 of

has a different one and they buy them for four, five million to cover the whole factory."

The problem, Brad explains, is that just a handful of people managed to become experts in these complex systems, creating bottlenecks in data analysis.

However, Spotfire offered a solution: "We deliver an interactive analysis environment that is not afraid of highly-technical, deeply domain-specific data, and we can apply high powered analytical methods, but our focus is on ease of use."

He adds: "Our end users are almost all engineers or scientists of some kind – process engineers, product engineers, yield engineers, production engineers, geophysicists, research scientists and the like."

Spotfire is an independent business unit within Cloud Software Group and is focused on serving domain-specific markets. Brad's role involves identifying those who stand to benefit most from Spotfire's technology, then building use cases to demonstrate its value.

What sets Spotfire apart?

Spotfire's uniqueness is that it delivers an interactive analysis environment that can handle domain-specific data while maintaining on ease of use and agility. This, says Brad, makes it "accessible to a broader range of users within organisations, including various types of engineers and scientists".

Spotfire's unique approach to data analysis is what Brad calls "visual data science".

"We give users an immersive experience in which they can apply their own expertise and creativity for problem solving"

BRAD HOPPER
VP OF VERTICAL MARKETS,
CLOUD SOFTWARE GROUP

"We combine visual-first exploration of data with industry-specific analytics so that we give our users an immersive experience in which they can apply their own expertise and use their creativity for problem solving," Brad explains.

This approach differs from traditional statistics tools, which often require users to have a deep understanding of statistical concepts and methodologies. Spotfire, though, focuses on applied statistics, making it possible for engineers and scientists to work effectively with complex data without needing to be statisticians.

Spotfire also stands out for its ability to handle massive amounts of data in memory. "Some of our users have close to a billion records of data in an analysis and they get a dynamic interactive experience for finding trends, outliers and insights," Brad reveals.

The software's extension framework allows for customisation and integration

BRAD HOPPER

TITLE: **VP OF VERTICAL MARKETS, CLOUD SOFTWARE GROUP**

INDUSTRY: **SOFTWARE DEVELOPMENT**

LOCATION: **UNITED STATES**

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With a background in engineering and a passion for problem-solving, he has helped shape Spotfire's visual analytics technology into a powerful tool for industries ranging from semiconductors to oil and gas.

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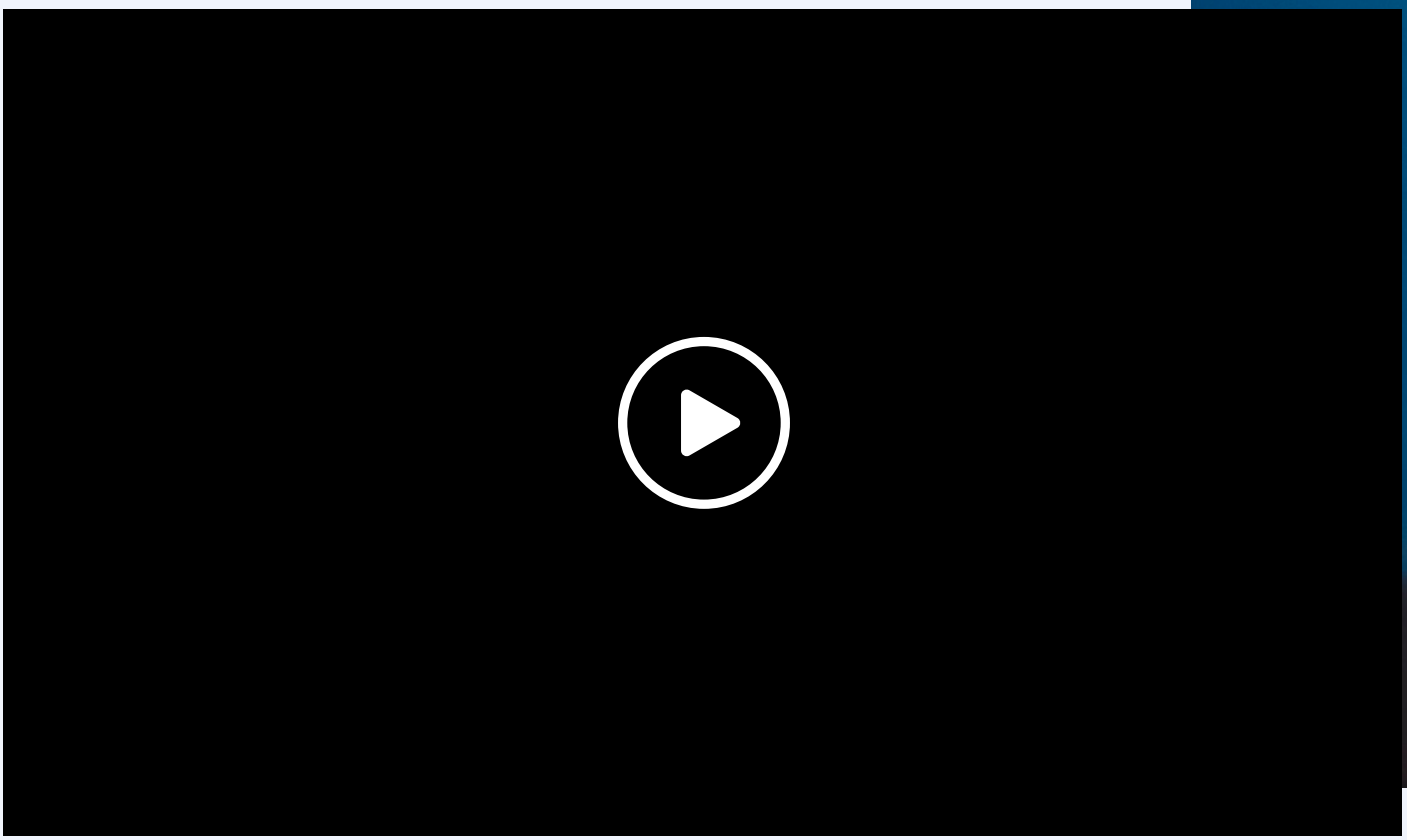
His journey with Spotfire began in the early days of the company.

"I joined just a few years after the company started. I was employee number 65," he recalls. "The moment I saw Spotfire, I said, 'this is something that really needs to be in the semiconductor business'," Brad explains.

"Those industries are very underserved from a data analytics perspective. They have these super-advanced, super high-powered and very complex vertical applications. Each of those industries has different ones, and they buy them for four, five million for the plant."



of various analytical methods, including Python, R and custom JavaScript visualisations. This flexibility enables users to tailor Spotfire to their specific needs and industry requirements.

Spotfire in the manufacturing sector

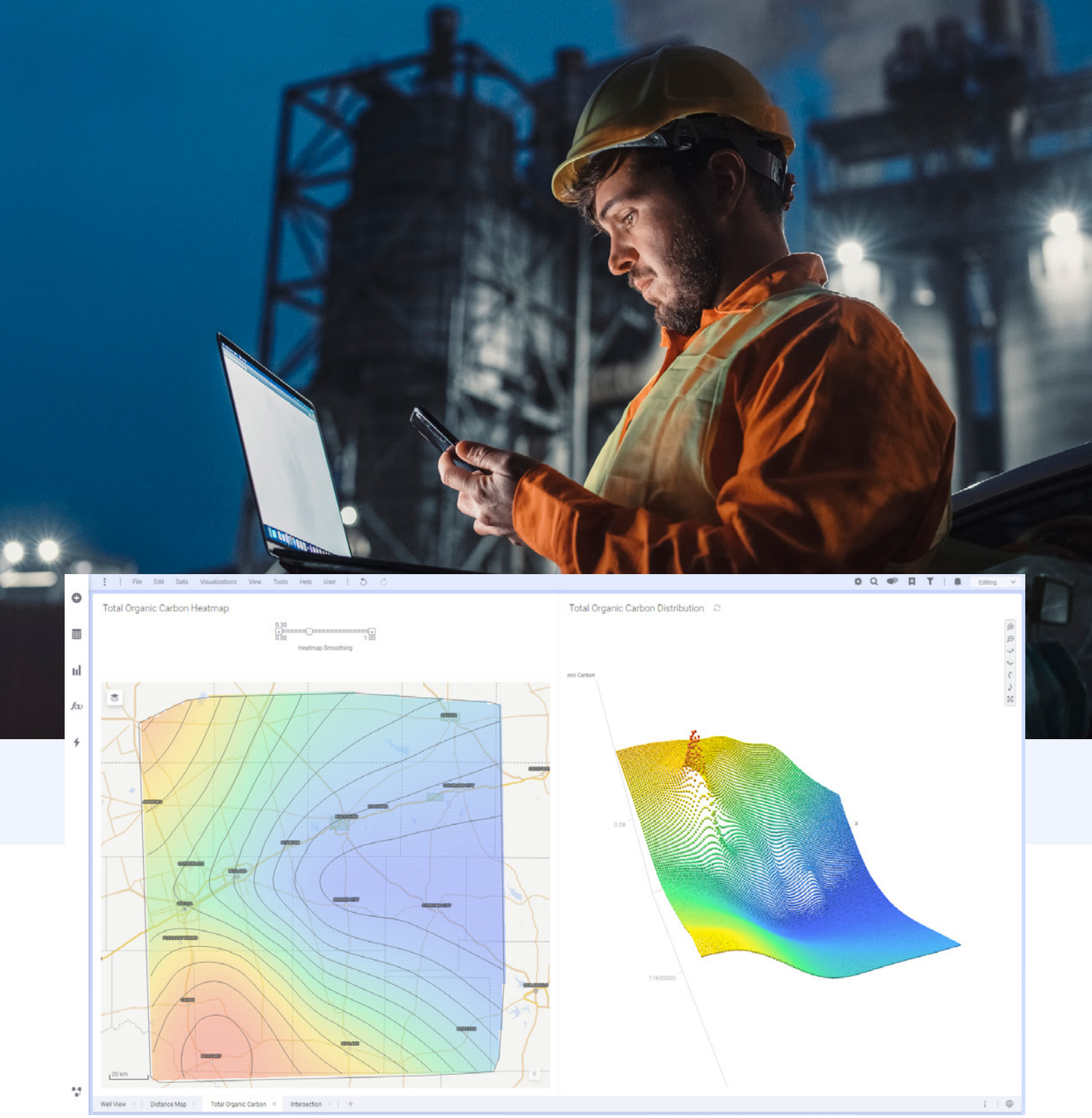
In the manufacturing sector, particularly in high-tech industries like semiconductor production, Spotfire plays a crucial role in various aspects of the production process, including yield engineering.

Yield engineers troubleshoot interactions between the manufacturing process and the device behaviour, including how many functional and high performing chips are produced. Getting new products to yield faster gets them to market faster and allows manufacturers to enjoy higher margins.

Brad explains the importance of yield engineering in semiconductor manufacturing: “If you can’t find that yield problem, the company might even struggle to stay in business.”

Spotfire helps manufacturers identify patterns and trends in semiconductor production, allowing them to detect and resolve issues quickly. This includes analysing spatial signatures on wafers, correlating manufacturing equipment data and identifying root causes of production problems.

One of Spotfire’s notable customers in this sector is STMicroelectronics,



a leading semiconductor manufacturer, which uses Spotfire to optimise the performance of their devices and to undertake root-cause analysis of production issues.

"STMicroelectronics users can track down the root cause of issues, resolve them quickly and proactively map out the process space," Brad says. He adds that this proactive approach allows manufacturers to "optimise production and make informed decisions about when to scrap materials that are likely to result in faulty chips."

Beyond yield engineering, Spotfire is also used in product engineering. Keysight, a US electronic test equipment manufacturer, uses Spotfire to define

> **“We’re looking to involve AI to recognise patterns, correlate data and perform complex analytical tasks with minimal user input”**

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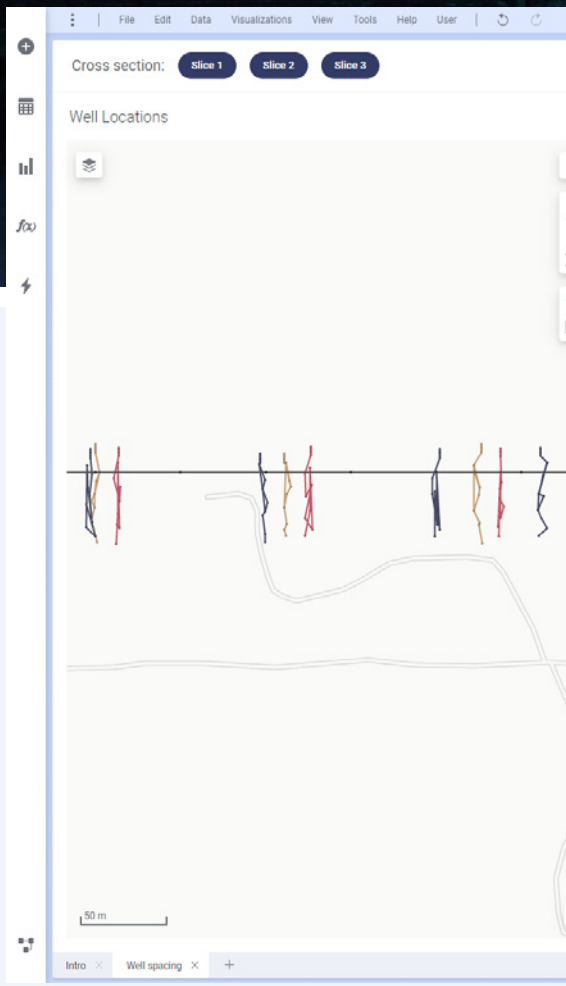
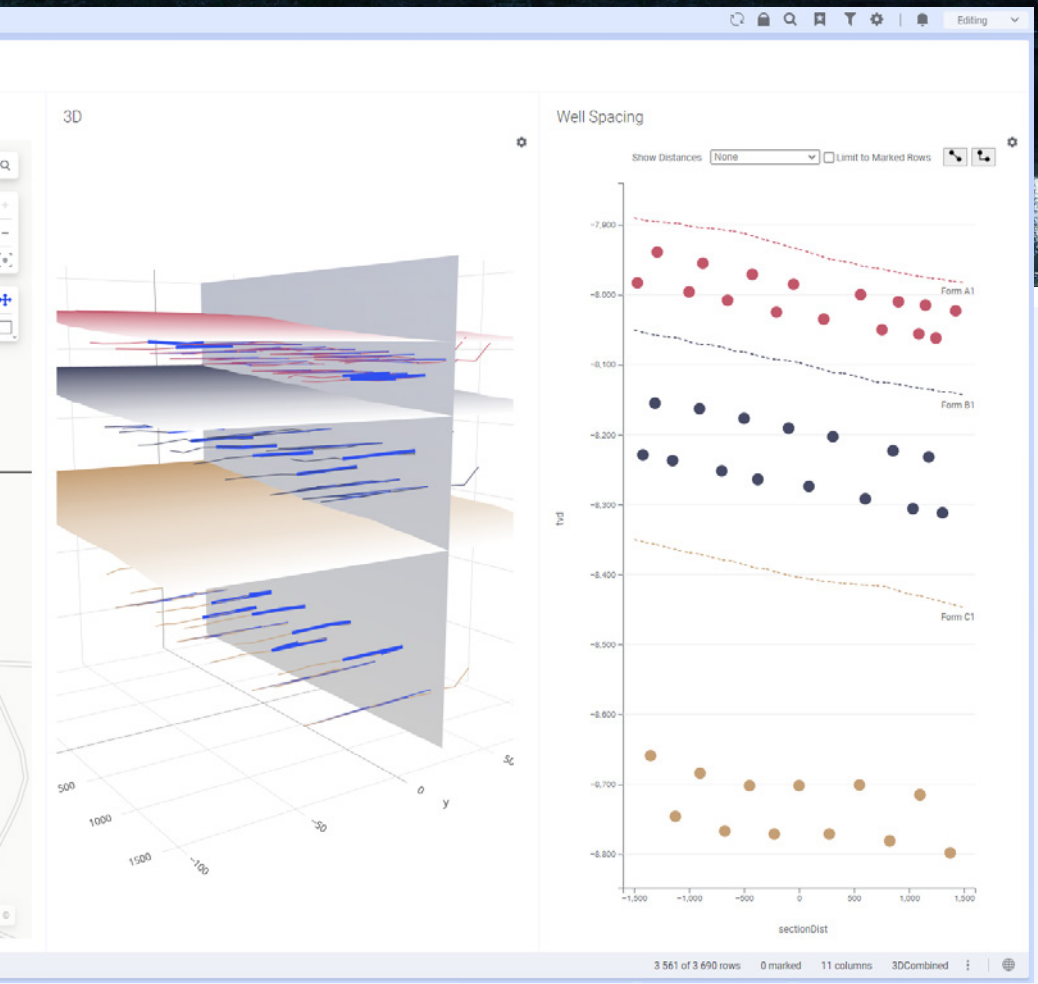
and test the capabilities of its equipment. This involves analysing complex data to ensure their products meet specified performance ranges and reliability standards.

Spotfire in the energy sector

In the energy sector, particularly in oil and gas, Spotfire serves various engineering roles across the production lifecycle, including reservoir engineers and geoscientists, drilling and completions engineers and production engineers.

Reservoir engineers and geoscientists use Spotfire to analyse complex geological data, including seismic attributes, core samples and historical data. This helps them make informed decisions about where to acquire leases and how to value potential extraction sites.




Editing
3D
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Show Distances
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Limit to Marked Rows
Form A1
Form B1
Form C1
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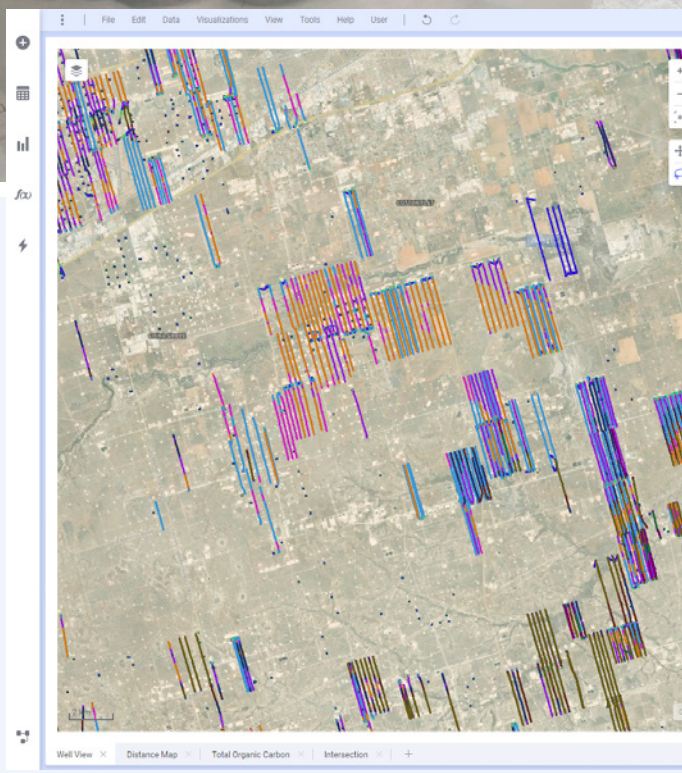
11 columns
3DCombined



"They use very sophisticated tools, especially mapping tools and GIS data, and they combine that with technical tools for petrophysics or well log analysis or cores," Brad continues.

Spotfire allows these professionals to integrate and visualise this diverse data, leading to more accurate assessments of potential oil and gas reserves.

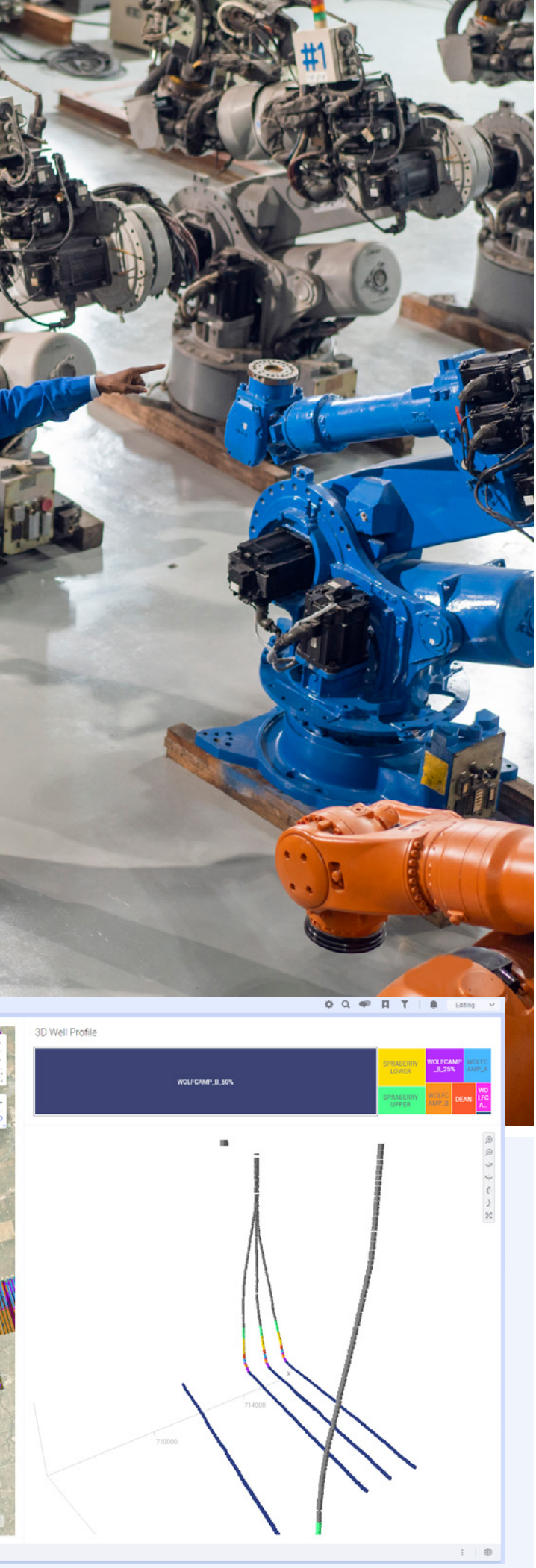
Drilling and completions engineers use Spotfire to plan and optimise drilling operations. They analyse data rom similar wells, project properties using interpolation techniques and make decisions about drilling paths and completion methods.

"Everything under the ground, since engineers can't actually see it, they use advanced analytics to infer what's most likely to be there," Brad says. Spotfire helps these engineers make informed decisions based on limited data points and complex geological models.

Production engineers, meanwhile use Spotfire to optimise ongoing resource extraction. This involves analysing equipment performance, monitoring production rates and making decisions about stimulation techniques to maximise oil and gas extraction while minimising damage to the subsurface formation.

The future of Spotfire

As data analysis needs continue to evolve, Spotfire is adapting to meet new challenges. One area of development is the ability to handle even larger datasets, potentially analysing trillions of data points by integrating with cloud-based compute cluster platforms like Databricks and Snowflake.



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Another exciting area of development is the integration of AI and machine learning capabilities. Spotfire is already leveraging large language models (LLMs) to make the software easier to use and automate complex analytical processes.

“We want to take that a step further to perform the entire analytical process,” Brad adds. This might involve using AI to recognise patterns, correlate data, and perform complex analytical tasks with minimal user input.

As industries continue to generate more data and seek deeper insights, tools like Spotfire are set to play an increasingly crucial role in turning raw information into actionable knowledge. By combining powerful analytical capabilities with an intuitive, visual interface, Spotfire is helping professionals across various sectors make better decisions and drive innovation.

“Every one of our customers is saying to us, ‘show us what we can do with this new technology’,” Brad concludes. “And we’re really at the forefront of leveraging that, but there’s a lot more that we could do.”

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