

## Computational Fluid Dynamics (CFD) and Thermal-Fluid Analysis Capability for Engineering Design

I, Chris Kriel, am a Freelance CFD & Thermal Analysis Specialist with more than 20 years' experience in this field, operating through my company FlowSim Pty Ltd. I have my own suite of simulation software, including CFD software.

Over the years I've been involved in many projects, across many industries, ranging from mine ventilation to cryogenic freezing of food to thermal analyses of electronics. My services are targeted at companies that:

- Have a project that may benefit from analyses but do not have access to CFD software.
- Have no/limited in-house expertise.
- Have a need for a 2<sup>nd</sup> opinion/some specialist input.

Below are some recommendations/testimonials of previous clients. More information about CFD and typical application areas are given at the end of this document.

### Recommendations/Testimonials

*Dylan Perera – Refrigeration Project Engineer at Gordon Brothers Industries*

Chris has been excellent to work with on our CFD simulations for various industrial mining projects. Understanding of the project requirements, good engineering understanding of dynamics of air flows, temperatures and pressures, with great turnaround times and flexible with timing, and well presented professional reports have all been noticeable positives in working with Chris. Would highly recommend for any CFD works required.

*Jesse McLachlan – Director and CTO at Ingenuity Design Group*

I have had the pleasure of working with Chris on a number of projects where he has provided his expertise in both CFD and Thermal simulations and has provided comprehensive and insightful analysis to assist with some complicated phenomena. He was able to promptly and efficiently deliver his results to us where other consultants struggled. I've no hesitation in recommending Chris and look forward to the next opportunity to work with him.

*Rhys Thompson – Managing Director at AirEng*

Chris has completed many CFD jobs for AirEng over the years, these have often been vastly different in nature and application. AirEng has validated the work Chris has done for us on site. From this we have a very high level of confidence in his work and have relied on his experience with many facets relating to gas / airflow. On one particular project we had a highly beneficial outcome from optimising designs that have not only reduced losses (saved energy) and reduced product dropout but while also lowering wear rates. He has always been proactive and prompt.

*Salman Faiz – Technical Lead – Tunnel Ventilation at John Holland*

During my time at Melbourne Metro, CYP contracted Chris to provide support in performing CFD studies.

Chris assisted CYP in developing optimized transition duct design for the main axial fans, Saccardo Nozzles, Guide Nozzles and Guide Vanes. He also performed dispersion modelling for MVAC exhausts.

Chris' ability to understand the application and apply best methods/practices of CFD tool enabled us to achieve the results with high level of confidence.

Chris also performed CFDs to assist CYP in developing fan room layouts ensuring natural air exchange can be achieved via train piston effect.

Chris is highly professional in the area he practices and is critical thinker and is always in a hunt to establish best possible solution for his client.

I will highly recommend Chris for any CFD related work!!

*William Briasco – Engineering Manager at AirEng*

Chris is a skillful and experienced professional regarding CFD analysis. I worked with him in several Ventilation Mining projects, where the optimization of air flow to minimize pressure losses is essential, and his expertise and quick response were critical. I would highly recommend Chris for any company needing CFD analysis.

*Rodney Brown – Engineering Manager at Outerspace Design and Director of Engineering at Vitruvian*

We have contracted Chris numerous times to setup and run CFD simulations. His attitude, work and attention to detail is fantastic. I would thoroughly recommend Chris to contract for all forms of CFD.

*Brent Owens – Co-Founder & Chief Research and Development Officer at Vitrafy Life Sciences*

Chris has been great to work with. He provides an incredibly high quality service and value for money. Very responsive, great depth of knowledge and detail in all results.

*Fred May – Senior Design Consultant at Synera Design*

Chris Kriel has consulted with our group on a number of Medical Respiratory development projects. His understanding of CFD, and his outstanding analysis skills made him technically invaluable to our effort. Chris worked well in remote or team environments and synchronised quickly in changing input scenarios.

*Rod Hendricks – Engineering Manager at Emissionless*

Chris provides exceptionally good quality work and value for money. He is thoughtful, helpful and provides great advice. His software is world leading.

## Why CFD?

Simulate – Understand – Optimize – Troubleshoot – Reduced Time to Market

### Optimize

- Quickly evaluate design options prior to product testing to save time and money while demonstrating design viability and performance.

### Understand

- Ability to evaluate implications of changes in design or process variables to rapidly gain a wider knowledge base.
- The ability to see the flow patterns over a broad range of operating conditions gives you the ability to determine the direction for your design changes.

### Troubleshoot

- Understand and diagnose problems quickly prior to physical testing/installation.
- CFD can uncover the source of problems and guide the direction for resolving them.

### Reduce time-to-market

- Speed development by modeling multiple scenarios, thereby ruling out unsuccessful attempts before conducting time-consuming product testing.
- Use CFD to direct the development path and support the experimental testing.

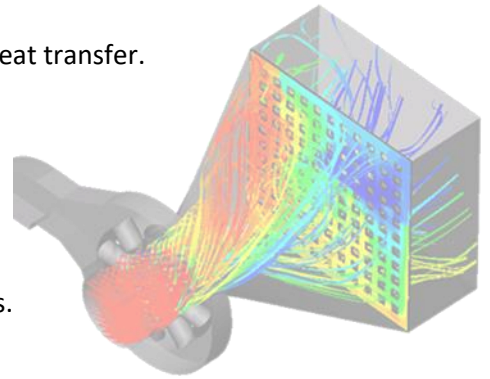


## Typical Application Areas

- Estimate pressure losses through complex geometries, ducting etc. Estimate pump/fan operating points.
- Estimate operational temperatures throughout the design, dependent on losses, process conditions etc.
- Visualize 3D flow patterns to identify areas of high/low velocities, recirculation. Assess flow uniformity.
- Virtually test product/design in abnormal environments that is difficult to achieve in experimental testing.
- Evaluate effect of changing design parameters, i.e. materials, geometry, coatings, fan and heat sink size etc.
- In essence anything involving flow of gas/liquid with or without heat transfer.

## Why use Me?

- 20 years' experience in this field, on a wide variety of applications.
- Flexible, easy to work with.
- Efficient and willing to walk to extra mile to meet deadlines.
- Cost-effective service.



Call/email me if you have any questions. I am happy to give honest advice on whether I believe my skills can add value/not for your project.

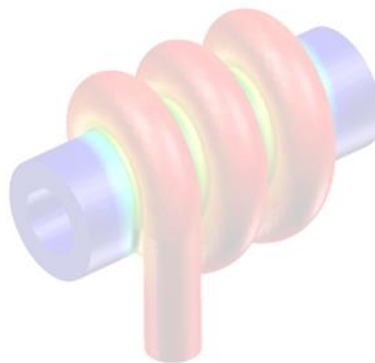
Please forward this flyer to your colleagues/other people you know who may have a need for this.

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Note that some images used are not my work, but for illustration purposes only.

It however is typical of the type of work I do.