

## CFD Update from CHAM's Agency ACFDA

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1. **Applied Computational Fluid Dynamic Analysis (ACFDA)** has been providing the advanced online PHOENICS CFD software **training courses** on various **environmental and cleantech applications** such as **indoor/outdoor air quality, virus transmission, wildfire propagation, green hydrogen production and safety**, etc. : <https://www.linkedin.com/feed/update/urn:li:activity:7136763368090079232/> . For these applications, we offer **customized and validated CFD models, training and consulting services**. The models are open to users and could be modified using the built-in PHOENICS In-Form capability. A **free webinar** could be arranged to briefly describe a model of interest.
2. **Advanced training** on CFD modeling of **complex multiphase fluid and heat flows in electrolysis stacks** recently provided for **Next Hydrogen Solutions Inc.** (<https://nexthydrogen.com/about/our-story/>) **yields results**. Using CFD methodology helps Next Hydrogen design the **unique and flexible electrolysis cell architecture**, which is suitable for dynamic renewable energy applications. Among advanced CFD capabilities are an Inter-Phase-Slip Algorithm (IPSA) applied for a variable bubble size, a distributed resistance model, a phase inversion model, a customized two-phase LVEL turbulence model and a cut-cell algorithm PARSOL.
3. **Physics-based multiphase WILDFIRE CFD model** published in [https://www.acfda.org/results/Agranat\\_Perminov\\_EMS\\_2020.pdf](https://www.acfda.org/results/Agranat_Perminov_EMS_2020.pdf), has been applied for propagation and interaction of front and back fires in a laboratory scale setting. An animation is presented on [www.acfda.org](http://www.acfda.org): [https://acfda.org/results/Tem1\\_90s.gif](https://acfda.org/results/Tem1_90s.gif). This model is recommended for additional validation in large-scale environments and further use for developing proper wildfire mitigation measures.
4. **Dynamic simulation of virus transmission** in a typical dental office with ventilation and air purification is illustrated with animations [https://acfda.org/results/AP\\_OFF.gif](https://acfda.org/results/AP_OFF.gif) and [https://acfda.org/results/AP\\_ON.gif](https://acfda.org/results/AP_ON.gif) on [www.acfda.org](http://www.acfda.org) and in a short summary [https://www.acfda.org/results/Aerosol\\_Dental1.pdf](https://www.acfda.org/results/Aerosol_Dental1.pdf). An **aerosol model** built in PHOENICS/FLAIR is employed. It is advised to **perform CFD analyses of indoor air quality and infection risks** in medical/dental offices, schools and other closed public spaces. CFD **makes polluted/contaminated clouds 'visible'** and, as a result, enables to propose **effective mitigation measures** aimed at keeping these places **safe and healthy**.
5. A **multi-group two-phase model of pollution dispersion** from industrial plumes described in [https://www.acfda.org/docs/Paper\\_ICONE22-30010\\_Agranat\\_et\\_al.pdf](https://www.acfda.org/docs/Paper_ICONE22-30010_Agranat_et_al.pdf) and [https://www.acfda.org/results/2014\\_ASSE-MEC\\_CFD.pdf](https://www.acfda.org/results/2014_ASSE-MEC_CFD.pdf) is recommended for analyses of **outdoor air quality and pollution dispersion** (in addition to built-in **aerosol model**).
6. **Inquiries** on ordering PHOENICS/FLAIR CFD software, training and consulting services could be sent to [info@acfda.org](mailto:info@acfda.org) .