

OFFRES DE STAGE SGR PARIS

Data Sciences

À PROPOS DE SAINT-GOBAIN

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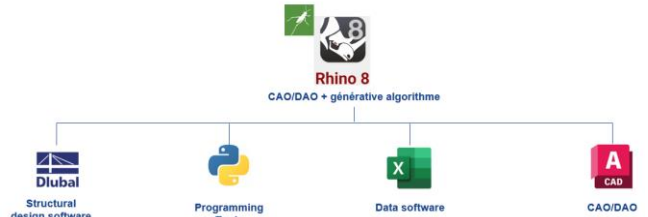
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Digital parametrization

Development of a Parametric Framework for Facade Layout Optimization

FRAMEWORK

The design process, prior to manufacturing and construction, involves multiple iterations to identify an optimal configuration, such as facade layouts. Parametric design tools can reduce repetitive and time-consuming tasks, including drafting and preliminary calculations, making the entire workflow more efficient



General workflow for digital parametrization of design process made by parametric software

GOALS OF INTERNSHIP

Develop a system to optimize façade layouts not only from a material and cost perspective but also in terms of mechanical and structural performance.

Implement parametric software to streamline traditionally iterative and complex processes, such as façade system definition and layout planning (calepinage).

Provide a digital tool capable of fast, reliable, and comprehensive comparisons in terms of material usage, costs, and lead times.

Contribute to the digitalization and automation of design and engineering processes, providing Saint-Gobain Solutions France with a powerful platform to generate façade configurations and compare them with existing solutions.

PROFILE

M2 master's student in Materials Science

Civil engineering or Architecture

COMPETENCIES

- **AutoCAD** – proficiency in 2D/3D CAD software for producing technical drawings.
- **Rhinoceros** – solid knowledge of 3D modeling software, with the ability to handle interoperability with other CAD tools.
- **Grasshopper** – advanced user skills for parametric modeling.

DURATION

6 months

LOCATION

SGR Paris
41 quai Lucien Lefranc
93303 Aubervilliers

CONTACT

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Metaheuristics for industrial problems

CONTEXT

Industrial solvers are widely used in real-world problems optimization. For large-scale or highly constrained problems they can be computationally expensive and time-consuming.

Metaheuristics — such as genetic algorithms, simulated annealing, or tabu-search — offer a promising approach by providing faster and potentially more cost-effective solutions. Such metaheuristics potential appears particularly in scenarios where exact solutions are not strictly necessary or performant solutions cannot be fastly reachable, or where approximate solutions are sufficient and valuable for decision makers.

During the internship, these methods will be applied to real-world industrial problems encountered within Saint-Gobain activities, such as production scheduling, facility location, and other combinatorial optimization challenges. The objective is to assess the performance of at least three selected metaheuristics, compare them with industrial solvers in terms of speed, scalability, and solution quality, and identify use cases where metaheuristics provide a clear advantage.

INTERNSHIP OBJECTIVES

You will be responsible for all phases of the project development. Under the supervision of an applied mathematics engineer, the intern will be in charge to:

- **Carry out a state of the art** of the different methods with their advantages and drawbacks;
- **Implement** several metaheuristics (genetic algorithms, simulated annealing, tabu-search ...) on various Saint-Gobain-specific use cases (scheduling, facility location, etc.);
- **Evaluate the performances** of the different implemented methods (solution quality, computation time, etc.)

DESIRED PROFILE

You are in 3rd year of engineering school or in the 2nd year of a Master Degree (mathematics & computer science) with solid knowledge in combinatorial optimization & computer dvpt ;

- You are motivated, curious, rigorous, enthusiastic, and have a taste for autonomy and experimentation;
- Knowledge in statistics and optimization software would be a plus.
- Knowledge or experience in metaheuristics would be a plus.

DURATION

6 mois

LOCATION

Saint Gobain Research Paris
41 quai Lucien Lefranc, 93303
Aubervilliers Cedex.

CONTACT

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Research Engineer

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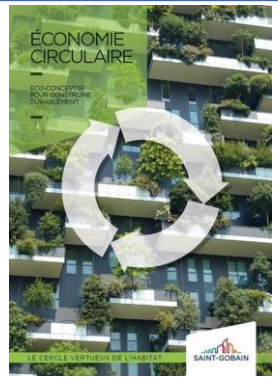
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Internship: Product Traceability in Circular Construction



CONTEXT

To achieve carbon neutrality by 2050, reducing embodied carbon is crucial. The circular economy is a key driver for this, particularly through the recycling and reuse of materials. This requires detailed traceability of the characteristics of materials used in existing buildings. Currently, information about these materials is fragmented and heterogeneous, while many public databases and models for stock estimation are emerging. At the same time, Saint-Gobain has designed, produced, and marketed hundreds of construction materials throughout the 20th century. The characteristics and applications of many of these products can be traced through its physical archives, including technical and marketing documentation, R&D notes, legal documents, production and sales statistics, physical samples, and more.

INTERNSHIP OBJECTIVES

The goal of the internship is to establish the state of the art regarding the material characteristics required for circularity, and to identify the most critical attributes for Saint-Gobain products. It will also aim at estimating the future volumes of materials expected from deconstruction activities.

- State of the art of current methodology to select appropriate data for construction products in a circular economy
- List the critical data (characteristics) of our material
- Estimate future volumes of deconstruction materials 2026-2030, using current existing databases and modelling
- Reflect on possible typology for flexible data storage and utilization, including the possibility to adapt over time extracted data we may need in the future

Potential areas of focus include architectural glass and glazing, insulation materials, plaster-based products, and cast-iron pipes.

CANDIDATE PROFILE

Second or third-year engineering student or Master (M1/M2), specializing in materials science with a strong interest in sustainability. Data science skills appreciated. Good communication skills required.

WORK ENVIRONMENT & HOW TO APPLY ?

Collaboration with multidisciplinary teams: Circular economy managers, R&D engineers (materials, processes, sociology, design, data science), Archives team in Blois

Duration: 6 months / **Locations:** Tour Saint-Gobain (Courbevoie), Archives (Blois), SGR Paris

Send CV, cover letter, academic transcript to marie.lamblat@saint-gobain.com and adrien.stoliaroff@saint-gobain.com

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Simulation numérique thermo-hydrodynamique et contrôle des écoulements de verre fondu

CONTEXTE

Le processus de production du verre nécessite un contrôle précis des flux de verre fondu. En raison de la haute température du fluide, il est particulièrement difficile d'obtenir des informations sur le flux à partir de mesures directes. Par conséquent, les simulations numériques (dynamique des fluides computationnels, ou CFD) sont un outil idéal pour observer en détail la dynamique du système et étudier comment le flux change sous l'effet de différents paramètres de contrôle. Ces paramètres incluent la contrainte thermique via des électrodes ou des brûleurs, ainsi que des motifs d'isolation thermique ad hoc aux limites du domaine fluide obtenus par différents degrés d'isolation. En contrôlant le transfert de chaleur dans le volume et aux limites, nous contrôlons la viscosité, la densité, ainsi que la conductivité thermique et électrique du verre fondu, qui sont très sensibles à la température locale. Cela permet ensuite de contrôler l'écoulement du fluide



OBJECTIFS DU STAGE

L'objectif du stage est double. Premièrement, l'étudiant utilisera un logiciel de CFD ainsi que le cluster de calcul haute performance de Saint-Gobain Recherche Paris pour explorer la sensibilité des champs d'écoulement et de température du verre fondu (c'est-à-dire la solution) par rapport à des paramètres opérationnels et de conception prédéfinis. Cette étude permettra d'identifier les mécanismes physiques dominants ainsi que les sources potentielles d'incertitude dans nos simulations. Deuxièmement, l'étudiant exploitera les données CFD haute fidélité pour développer un modèle réduit (MR) du système. Ce MR devra être suffisamment précis et rapide pour être utilisé dans des contextes d'optimisation de conception et de contrôle en ligne.

PROFIL SOUHAITÉ

Étudiant en Master 2 ou en fin de cycle ingénieur, avec un intérêt particulier pour la modélisation des fluides, la physique numérique et la modélisation basée sur les données.

DURÉE

4-6 mois

LIEU

Saint-Gobain Research Paris
41 Quai Lucien Lefranc
93300 Aubervilliers

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LLMs & Materials: Exploring a New Paradigm at Saint-Gobain

CONTEXT

At Saint-Gobain, we are shaping the future of materials by integrating cutting-edge technologies. The rise of Large Language Models (LLMs) and Material Informatics is opening a new paradigm for leveraging scientific data.

This internship ultimately aims to create a system capable of analyzing any type of document (text, graphs, spreadsheets...) and integrating it into an intelligent knowledge base. The goal: accelerate material research and innovation through AI, ontologies, and knowledge graphs.



GOALS OF THE INTERNSHIP

- Explore the impact of prompts on LLM performance and design a robust benchmarking methodology, starting with PDF files of scientific articles.
- Conduct a state-of-the-art review: analyze the scientific literature and identify the most effective methods and best practices used elsewhere.
- Horizon: Develop a universal analysis system to position any document within a coherent ontology.

PROFILE

Master 2 (or equivalent) student in data science, AI, computer science, or a related field, with a strong interest in material science.

Skills in software development (Python etc).

Curiosity about LLMs & machine learning.

Creativity and a taste for experimentation.

DURATION

~ 6 months

LOCATION

Saint-Gobain Research Paris
41 quai Lucien Lefranc 93300
Aubervilliers

RER B, M 12

CONTACTS

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LLMs & Matériaux : Explorer un nouveau paradigme chez Saint-Gobain

CONTEXTE

Chez Saint-Gobain, nous façonnons l'avenir des matériaux en intégrant des technologies de pointe. L'essor des grands modèles de langage (LLMs) et de l'informatique des matériaux ouvre un nouveau paradigme pour exploiter les données scientifiques.

Ce stage vise ultimement à créer un système capable d'analyser tout type de document (texte, graphiques, tableurs...) et de l'intégrer dans une base de connaissances intelligente. L'objectif : accélérer la recherche et l'innovation sur les matériaux grâce à l'IA, aux ontologies et aux graphes de connaissances.



OBJECTIFS DU STAGE

- Explorer l'impact des prompts sur la performance des LLMs et concevoir une méthodologie de benchmark robuste, en commençant par des fichiers PDF d'articles scientifiques.
- Réaliser un état de l'art : analyser la littérature scientifique et identifier les méthodes les plus efficaces et les meilleures pratiques utilisées ailleurs.
- Horizon : développer un système d'analyse universel pour positionner tout document dans une ontologie cohérente.

PROFIL

Étudiant·e en Master 2 (ou équivalent) en data science, IA, informatique ou domaine connexe, avec un fort intérêt pour la science des matériaux.

Compétences en développement logiciel (Python, etc.).

Curiosité pour les LLMs et le machine learning.

Créativité et goût pour l'expérimentation.

DURÉE

~ 6 mois

LIEU

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