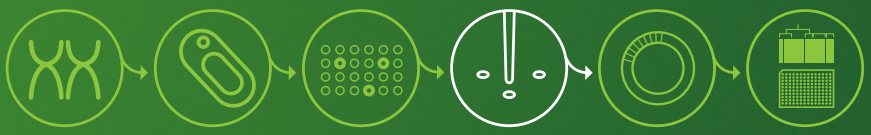
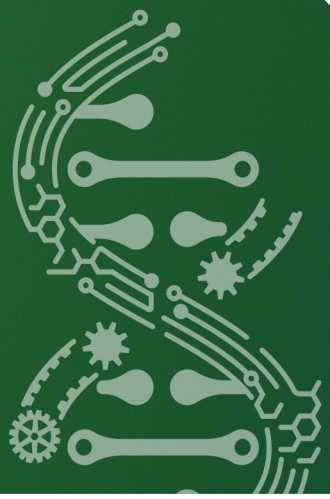
Hudson ROBOTICS

SYNTHETIC BIOLOGY SERIES

Colony Picking





In 2003, Hudson Robotics designed a synthetic biology workcell, named "Continuous High-Throughput Synthetic Chromosome Assembly and Transfection for Industrial Production of Biofuels and Bio-Based Chemicals," for the USDA. It was a track- and robot-based automated system that assembled genes from oligos and included PCR, purification, transformation, plating & colony growth, colony picking, plasmid prep, cloning, protein expression, and protein purification. In the years since then, Hudson Robotics has helped many customers automate their synthetic biology laboratories. Even when customers are transitioning to synthetic biology projects with an incremental approach, rather that adopting them wholesale, the place where they often begin is with colony picking. Colony picking instrumentation may be viewed as the heart of a synthetic biology program and considerable research into its capabilities and compatibilities should go into its selection.

Colony Picking Instrumentation

After transformation and gridding (or plating), the next step in the synthetic biology process is colony picking. It is a necessary step because transformation protocols are only partially effective, and one must pick the clones that are most likely to display the phenotype desired and grow them up in separate cultures. Although picking can be performed by hand, it is necessary to get help from automated instrumentation when there are thousands of colonies to process.

The picking system captures an image of the source dish or plate. Selection of clones can be semi- or fully-automated. In a semi-automated protocol, the image is analyzed by a human operator. This can occur at a remote location, if the system is so equipped. The operator selects which colonies on the dish or plate to select, and the instrumentation proceeds with the creation of plates holding the separated clones. With a fully automated setup, the operator chooses parameters for automatically identifying candidate colonies, such as radius, amplitude, elongation, conformity, separation, and color. The concept is to select image parameters that describe positive colonies and exclude negative ones and other background. In this manner, the destination plate is likely to have one or more of the phenotypes desired with minimal time, media, and plate space used to grow negative colonies.

Additional Considerations

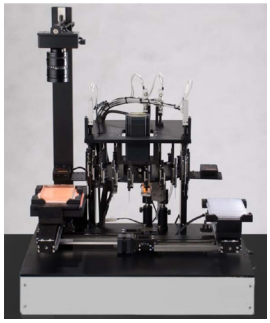
If you're setting up a synthetic biology workstation, either now or in the future, there are several other things you'll want to keep in mind, in addition to the basic functionalities already mentioned. The instrumentation solution you choose should have a throughput capacity that supports your work schedule. Environmentally controlled plate sealing, with gas-permeable film if indicated, and automated plate loading, are needed. The system must work in an anaerobic chamber if you are working with anaerobes. If you need duplicate plates, the destination plate inoculation system should be able to handle two plates at once, rather than requiring that you wait for a second plate to grow up. Finally, a barcode reader and the ability to trace a clone all the way back to the image of the dish or plate and the colony it came from are necessary for repeatability and record-keeping.

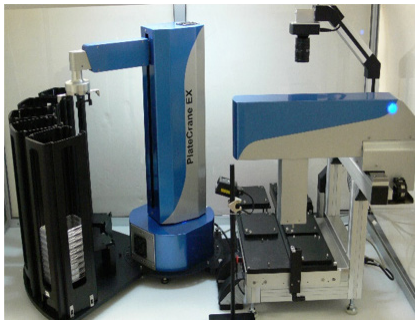
Hudson Robotics Solutions

RapidPick™ colony picking systems from Hudson Robotics are fully automated high-throughput microbial colony picking workcells. RapidPick systems offer the following capabilities:

- Robotic loading and unloading
- Automated fresh media filling
- Automated gas-permeable plate sealing
- Barcode scanning
- Up to 2400 picks per hour
- 99+% inoculation success
- Capacity of 225 colony plates
- Small footprint for anaerobic chambers

Hudson Robotics has four RapidPick systems to select from, depending on your needs. The latest one, the RapidPick Harvester, identifies and extracts sample plugs of microbial colonies or fungal samples grown on agar or in semi-solid media.





CLICK TO EXPLORE COLONY PICKING SOLUTIONS

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