CLAIMS:

1. A laboratory coordination system, comprising:
a laboratory coordination device including:
a networking component configured to send and receive information over a network;
a non-transitory computer-readable storage medium configured to store software instructions; and
at least one processor configured to execute the software instructions for:
establishing one or more network connections with one or more laboratory instruments and/or one or more user devices;
obtaining an experimental protocol, the experimental protocol including a plurality of experiment steps to be performed;
providing a first instruction for performance of a first experiment step of the plurality of experiment steps in response to a first instruction request;
receiving an indication that the first experiment step is complete; and
providing a second instruction for performance of a second experiment step of the plurality of experiment steps in response to a second instruction request.

2. The laboratory coordination system of claim 1, wherein obtaining the experimental protocol includes obtaining a stored experimental protocol.

3. The laboratory coordination system of claim 2, wherein obtaining the stored experimental protocol includes obtaining the stored experimental protocol from a stored list of experimental protocols.

4. The laboratory coordination system of claim 3, wherein the stored list is prioritized.

5. The laboratory coordination system of claim 4, wherein the stored list is prioritized according to at least on of:
throughput maximization;
single experiment completion minimization; and/or

a priority factor.

6. The laboratory coordination system of claim 2, wherein obtaining the stored experimental protocol includes obtaining a plurality of stored experimental protocols according to identified capabilities of the one or more laboratory instruments.

7. The laboratory coordination system of claim 6, wherein the identified capabilities include one or more of:
instrument functionality,
instrument capacity,
instrument processing time,
instrument movement,
instrument response time,
instrument parameters, and
instrument consumable compatibility.

8. The laboratory coordination system of claim 6, wherein the identified capabilities include one or more of:
instrument remaining capacity,
instrument supply levels,
instrument availability,
instrument uptime, and
instrument location.

9. The laboratory coordination system of claim 6, wherein the at least one processor is further configured for:
generating a plurality of instructions corresponding to the plurality of stored experimental protocols; and
providing the plurality of instructions to the one or more laboratory instruments to be carried out in an interleaved fashion on the one or more laboratory instruments.

10. The laboratory coordination system of claim 1, wherein the at least one processor is further configured for:

obtaining a second experimental protocol during performance of instructions related to the experimental protocol;

generating additional instructions for performance of steps related to the second experimental protocol; and

providing the additional instructions to the one or more laboratory instruments to cause execution of the additional instructions in an interleaved fashion with execution of the instructions related to the experimental protocol.

11. The laboratory coordination system of claim 1, wherein the at least one processor is further configured for:

accessing a conversion library from among a plurality of conversion libraries, each conversion library corresponding to a type of laboratory instrument and containing machine instructions configured to cause the execution of corresponding assay protocol steps on a laboratory instrument corresponding to the respective type of laboratory instrument, wherein the conversion library is selected based on an identified instrument type of the one or more laboratory instruments; and

generating the first instruction according to the conversion library.

12. The laboratory coordination system of claim 11, wherein the type of laboratory instrument includes at least one of:
instrument manufacturer,
instrument model,
instrument software version,
instrument hardware version,
instrument modifications,
instrument functionality, and
instrument identifier.

13. The laboratory coordination system of claim 1, wherein obtaining the experimental protocol includes obtaining an experimental protocol according to inputs via the one or more user devices.

14. The laboratory coordination system of claim 1, wherein the first instruction request is received from a user device operating a graphical user interface via the one or more network connections and the first instruction includes a first command configured to cause the graphical user interface to provide instructions for the first experiment step.

15. The laboratory coordination system of claim 1, wherein the instructions are provided in at least one of visual, textual, and audible formats.

16. The laboratory coordination system of claim 1, wherein the indication that the first experiment step is complete is received from a user device operating a graphical user interface via the one or more network connections.

17. The laboratory coordination system of claim 16, wherein the indication includes the second instruction request and the second instruction includes a second command configured to cause the graphical user interface to display instructions for the second experiment step.

18. The laboratory coordination system of claim 16, wherein:

the second instruction request is received from a second instrument of the one or more instruments responsive to the second instrument identifying the assay plate after the indication that the first experiment step is complete, and

the second instruction is generated according to a correspondence between the second experiment step and the second instrument.

19. The laboratory coordination system of claim 1, wherein:

the first instruction request is received from a first instrument of the one or more instruments responsive to the first instrument identifying the assay plate, and

the first instruction is generated according to a correspondence between the first experiment step and the first instrument.

20. The laboratory coordination system of claim 18, wherein the correspondence indicates a capability of the first instrument to perform the first experiment step; and

the first instruction includes a command to perform the first experiment step.

21. The laboratory coordination system of claim 20, wherein the command to perform the first experiment step causes the first instrument to carry out actions associated with the first experiment step.

22. The laboratory coordination system of claim 20, wherein the capability of the first instrument is defined according to at least one of:

online/offline status;

usage status;

functional status; and

consumable availability status.

23. The laboratory coordination system of claim 18, wherein the correspondence indicates an inability of the first instrument to perform the first experiment step; and

the first instruction includes no command to perform the first experiment step.

24. The laboratory coordination system of claim 1, wherein the experimental protocol is an assay protocol to be performed on an assay plate.

25. The laboratory coordination system of claim 24, wherein the assay protocol is an electrochemiluminescence protocol.

26. The laboratory coordination system of claim 1, wherein the one or more laboratory instruments include at least one of:

an electrochemiluminescence reader,

an assay plate washer,

an assay plate shaker,

an assay plate incubator, and

a pipettor.

27. A laboratory coordination system, comprising:

a laboratory coordination device including:

a networking component configured to send and receive information over a network;

a non-transitory computer-readable storage medium configured to store software instructions; and

at least one processor configured to execute the software instructions for:

establishing one or more network connections with one or more laboratory instruments or one or more user devices;

obtaining a plurality of experimental protocols, each experimental protocol including a corresponding plurality of experiment steps to be performed on a corresponding assay plate;

receiving a first identification of a first assay plate from a first instrument of the one or more instruments;

selecting a first experimental protocol from the plurality of experimental protocols according to the first identification;

selecting a first experiment step from the first experimental protocol according to a capability of the first instrument; and

providing a first instruction to the first instrument to perform the first experiment step on the first assay plate.

28. A laboratory coordination system, comprising:

a laboratory coordination device including:

a networking component configured to send and receive information over a network;

a non-transitory computer-readable storage medium configured to store software instructions; and

at least one processor configured to execute the software instructions for:

establishing one or more network connections with one or more laboratory instruments and/or one or more user devices;

obtaining an experimental protocol, the experimental protocol including a plurality of

experiment steps to be performed;

providing a first instruction to a user via the one or more user devices for performance of a first experiment step of the plurality of experiment steps in response to a first instruction request;

receiving an indication that the first experiment step is complete; and

providing a second instruction to the user via the one or more user devices for performance of a second experiment step of the plurality of experiment steps in response to a second instruction request.

29. A laboratory coordination system, comprising:

a laboratory coordination device including:

a networking component configured to send and receive information over a network;

a non-transitory computer-readable storage medium configured to store software instructions; and

at least one processor configured to execute the software instructions for:

establishing one or more network connections with one or more instruments or one or more user devices;

obtaining a plurality of experimental protocols, each experimental protocol including a corresponding plurality of experiment steps to be performed;

receiving a first identification of a first assay plate from a first instrument of the one or more instruments;

selecting a first experimental protocol from the plurality of experimental protocols according to the first identification;

selecting a first experiment step from the first experimental protocol according to a capability of the first instrument;

providing a first instruction to the first instrument to perform the first experiment step; and

providing a second instruction to a user via the one or more user devices to facilitate a second experiment step.

30. A laboratory coordination system, comprising:

a laboratory coordination device including:

a networking component configured to send and receive information over a network;

a non-transitory computer-readable storage medium configured to store software instructions; and

at least one processor configured to execute the software instructions for:

establishing one or more network connections with one or more instruments devices;

obtaining a plurality of experimental protocols, each experimental protocol including a corresponding plurality of experiment steps to be performed on a corresponding assay plate;

receiving a first identification of a first assay plate from a first instrument of the one or more instruments;

selecting a first experimental protocol from the plurality of experimental protocols according to the first identification;

providing a first instruction to the first instrument to perform a first experiment step on the first assay plate; and

providing a second instruction to the first instrument to perform a second experiment step on the first assay plate.

31. A computer-implemented method of laboratory coordination carried out by a laboratory coordination device including at least one processor configured to execute software instructions, the method comprising:

establishing one or more network connections with one or more laboratory instruments and/or one or more user devices;

obtaining an experimental protocol, the experimental protocol including a plurality of experiment steps to be performed;

providing a first instruction for performance of a first experiment step of the plurality of experiment steps in response to a first instruction request;

receiving an indication that the first experiment step is complete; and

providing a second instruction for performance of a second experiment step of the plurality of experiment steps in response to a second instruction request.

32. A computer-implemented method of laboratory coordination carried out by a laboratory

coordination device including at least one processor configured to execute software instructions, the method comprising:

establishing a plurality of network connections with a plurality of laboratory instruments and/or one or more user devices;

identifying instrument types corresponding to the plurality of laboratory instruments

identifying a capability set of the plurality of laboratory instruments according to the plurality of instrument types;

obtaining a plurality of experimental protocols, each of the experimental protocols including a plurality of experiment steps to be performed; and

generating a plurality of instructions to be provided to the plurality of laboratory instruments for performing the plurality of experimental protocols.

33. The computer-implemented method of laboratory coordination of claim 32, further comprising:

accessing a plurality of conversion libraries, each conversion library corresponding to a type of laboratory instrument and containing machine instructions configured to cause the execution of corresponding assay protocol steps on a laboratory instrument corresponding to the respective type of laboratory instrument, wherein the plurality of conversion libraries are selected based the instrument types of the plurality of laboratory instruments; and

generating the plurality of instructions according to the conversion library.